INFLUENCE OF CLASSROOM ENVIRONMENT ON PUPILS' ENGAGEMENT IN MATHEMATICS IN PANKSHIN LOCAL GOVERNMENT EDUCATION AUTHORITY, PLATEAU STATE

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Abstract

This study investigates the influence of the classroom environment on pupils' engagement in mathematics in Pankshin Local Government Education Authority, Plateau State. The research was guided by two research questions and adopts a descriptive survey design. The population of the study comprised of 527 public primary school teachers from the 15 public primary schools in Pankshin LGEA. The sample size of the study comprised of 150 teachers from the 15 public primary schools in Pankshin LGEA, using a simple random sampling technique. Data were collected using a 24-item structured questionnaire: Influence of Learning Environment on Pupils Engagement in Mathematics (ICLEPEM) on a 4-point Likert scale of Strongly Agree (4 points), Agree (3 points), Disagree (2 points) and Strongly Disagree (1 point). The instrument was validated for face and content validity by three experts, two from the Department of Early Childhood Care and Education and one expert from the Measurement and Evaluation unit of the Department of Educational Foundations at the Federal College of Education, Pankshin. Reliability was established using Cronbach's Alpha, resulting to a reliability coefficient of 0.87 which shows that the instrument is reliable. The research questions were analysed using the mean statistics where a mean score of 2.50 and above indicated agreed and a mean score below 2.50 indicated a disagreed. Findings of the study revealed that classroom environment is important because it improves pupil's critical thinking in mathematics and encourages active learning and participation among others. Findings also revealed that the influence of classroom environment on pupils' engagement includes among others that it makes pupils enjoy mathematics lessons; it helps pupils to answer questions in mathematics class and makes pupils feel excited when solving mathematics problems in a well-arranged classroom. The study concludes that a well-maintained classroom environment and diversified teaching methods are crucial for fostering pupil engagement,

particularly in mathematics. Based on the findings of the study, it was recommended among others that schools should actively engage parents and communities in supporting classroom environments by organizing workshops to educate parents about the importance of a conducive learning atmosphere and encouraging community involvement in school activities.

Keywords*: Classroom, learning environment, pupils' engagement, mathematics, primary schools*

Introduction

Primary education is the foundational stage of formal education, vital in shaping the cognitive, emotional, and social development of children. Primary education is a crucial education for children aged 6-11 years plus, it aims to instill literacy, numeracy, effective communication skills, scientific skills, manipulative skills, critical and reflective thinking, among others (Federal Republic of Nigeria, FRN, 2013). It also aims to develop children's ability to function effectively in society within their capabilities, ensuring they are equipped to handle the changing environment. At this stage, learning environment plays a significant role in determining the quality of education that pupils receive. A conducive learning environment encompasses of the physical, psychological, and social aspects of an educational setting, which together create an atmosphere that fosters learning, growth, and development in children.

The concept of the learning environment in primary education refers to the broader context in which learning occurs, including both in-school and out-of-school factors that influence the educational experience. It involves not only the physical space but also the social interactions, teaching methods, and overall atmosphere that surround the learning process (Fraser, 2020). A supportive and well-structured environment encourages active participation, promotes positive behavior, and enhances learning experiences (Dorman, 2018). In primary education, where children are developing foundational skills in literacy, numeracy, and social interaction, the

learning environment must be nurturing, inclusive and stimulating. It should cater for the diverse needs of pupils, including those with different learning styles and abilities (Brady and Harder, 2018). The classroom environment is a more specific aspect of learning environment that focuses on the immediate setting where instruction and learning take place.

Classroom environment is a place designed for children to learn. The classroom environment is also refers to the physical, social and emotional surroundings that influence pupils learning experiences (Akomolafe and Adesua, 2015). According to Moos (2019), the classroom environment can be categorized into three dimensions: relationship, which deals with interactions and communication; personal development, which focuses on the growth opportunities provided; and system maintenance and change, which involves the rules, structure, and organization of the classroom. This includes the physical layout of the classroom, the resources available, the interactions between teachers and pupils, and the pedagogical practices employed. Hattie (2019) buttressed that a supportive classroom environment is characterized by positive teacher-pupil interactions, cooperative learning opportunities, and flexible furniture design. Given the magnitude of the importance of classroom environment to the teaching and learning process, there seem to be environmental standards by which learning environments are established. These standards help to enhance the quality of services provided in schools. Emphasizing on the quality of preschool environments, the Organization for Economic Co-operation and Development (OECD, 2018) noted that, the foundation for learning and continuous development depends on a nurturing and stimulating environment. Therefore, learning environments in primary schools ought to be built and equipped to be learner-friendly, teacher enabling, aesthetically pleasing, and supportive of diverse teaching and learning activities.

A positive classroom environment that is rich in resources, supportive interactions, and effective instructional strategies fosters a sense of belonging and interest among pupils, leading to higher levels of engagement and motivation (Wang and Holcombe, 2020). Research has shown that when pupils perceive their classroom environment as positive and supportive, they are more likely to be engaged in learning activities and motivated to succeed (Patrick, Ryan, and Kaplan, 2017). In contrast, a poorly managed classroom environment with negative teacher-pupil interactions, inadequate resources, and unclear expectations can lead to disengagement, reduced motivation, and even behavioral problems (Klem and Connell, 2018). The classroom environment is not just a physical space but a dynamic setting that significantly impacts pupils' experiences, especially in challenging subjects like mathematics. Research shows that a well-structured environment reduces anxiety, increases enjoyment, and boosts motivation and engagement, especially in challenging subjects like mathematics (Borup, West, and Graham, 2020).

Mathematics is a critical subject in the primary education curriculum, serving as a foundation for problem-solving, logical reasoning, and analytical skills essential for later academic and life success. Mathematics subject is critical to learner's cognitive development, future job choices, as well as the development of the nation and society as a whole. This is because mathematics builds on the learners' numeracy ability. Osaduwa (2018) described mathematics as a subject of figures or science of size and numbers. Osaduwa further referred to mathematics as a universal subject which provides a means of sharpening the mind of an individual, shaping his reasoning ability and developing his personality. The importance of mathematics extends beyond the classroom, as it influences various sectors, including science, technology, engineering, and mathematics (STEM). Mathematics has been made compulsory for children in primary and secondary schools in Nigeria due to the emphasis placed on the subject (FRN, 2013).

Mathematics is often perceived as a challenging subject, deterring pupils from engaging fully and persisting in their studies. Research indicates that a negative attitude toward mathematics can lead to anxiety and a lack of confidence in one's mathematical abilities (Tschannen-Moran and Woolfolk-Hoy, 2021). The motivation for this study stems from the growing concern about the declining performance and interest in mathematics among pupils, particularly in Plateau State. Despite the importance, there is a significant gap in mathematics achievement among pupils, with many struggling to grasp basic concepts and apply them effectively. However, many classrooms face challenges such as overcrowding, inadequate resources, and limited teacher training, which can create an environment that is not conducive to learning (Okwelle and Okeke, 2019). These challenges are exacerbated by socio-economic factors, which further hinder pupils' ability to engage with and be motivated in mathematics (Ikegbusi, Egwu and Iheanacho, 2021). This study explores factor such as engagement as a factor causing this abysmal display of poor achievement of pupils in mathematics.

Engagement in learning involves active participation and investment in the educational process. According to Fredricks, Blumenfeld, and Paris (2018), engagement refers to the observable behaviours of pupils, such as participation in classroom activities, attendance, and effort put into learning tasks. Operationally, pupils' engagement is the extent to which students are actively involved in and committed to their learning. Engaged pupils are more likely to exhibit curiosity, actively participate in discussions, and put forth effort, especially in challenging subjects like mathematics. They encourage critical thinking and creative problem-solving, which is crucial in these subjects (Appleton, Christenson, and Furlong, 2018). Additionally, engaged pupils are less likely to exhibit disruptive behaviours, as their focus is on the learning tasks. In Plateau State, the level of pupils' engagement in mathematics has been a point of concern for educators. It is

therefore against this background that this study seeks to determine the influence of classroom environment on pupils' engagement in mathematics in Pankshin Local Government Education Authority of Plateau State.

Statement of the Problem

In an ideal educational setting, the classroom environment is designed to foster optimal learning, where every pupil feels engaged, motivated, and supported in their academic journey. Specifically, in mathematics, an ideal classroom environment would be one where pupils are actively involved in the learning process, show enthusiasm for the subject, and are motivated to overcome challenges. Teachers in this setting are well-trained, use effective instructional strategies, and create a positive atmosphere that encourages participation, collaboration, and critical thinking. For instance, in an ideal mathematics classroom, pupils would work together in groups to solve complex problems, with the teacher facilitating discussions and providing guidance. The classroom would be equipped with necessary resources such as textbooks, manipulative, and technology that enhance learning. Moreover, the teacher would be attuned to the individual needs of each pupil, offering additional support to those who struggle and challenging those who excel. This environment would promote a love for mathematics and a belief in its relevance to real-world situations, leading to high levels of engagement and sustained motivation.

However, the reality in many classrooms in Plateau State falls short of this ideal. The present situation is marked by several challenges that hinder the creation of an optimal learning environment, particularly in mathematics. Overcrowded classrooms, limited resources, and inadequate teacher training are common issues that adversely affect pupils' engagement and motivation. For example, a mathematics classroom in Plateau State usually have over 50 pupils,

making it difficult for the teacher to give individualized attention or manage the class effectively. This overcrowding leads to a chaotic environment where pupils are easily distracted and disengaged. The researcher's observation affirmed that pupils in public primary schools in Plateau State who struggles with basic arithmetic receive little to no additional support in the current classroom environment. Without intervention, these pupils may continue to fall behind, lose confidence, and eventually disengage from the subject altogether. This scenario is all too common and highlights the urgent need for improvements in the classroom environment. The disparities between the ideal and present situations underscore the critical need for this study.

Purpose of the Study

The purpose of the study is to examine the influence of classroom environment on pupils' engagement in mathematics in Pankshin LGEA of Plateau state. Specifically, the study sought to determine the:

1. Importance of classroom environment on pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State.
2. Influence of classroom environment on pupil's engagement in Mathematics in Pankshin Local Government Education Authority of Plateau State.

Research Questions

The following research questions guided the study.

1. What are the importance of classroom environment on pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State?
2. What are the influence of classroom environment on pupil's engagement in Mathematics in Pankshin Local Government Education Authority of Plateau State?

Methods

This study was conducted to examine the influence of the classroom environment on pupils' engagement in Mathematics in Pankshin LGEA, Plateau State. It was guided by two research questions. The descriptive survey design was employed for the study. The population consisted of 527 public primary school teachers from the 15 public primary schools in Pankshin LGEA. Sample size of 150 teachers were selected through the use of simple random sampling technique. A 24 item structured questionnaire title "Influence of Classroom environment on Pupils Engagement in Mathematics (ICLEPEM)" questionnaire was used for data collection on a 4-point Likert scale of Strongly Agree (4 points), Agree (3 points), Disagree (2 points) and Strongly Disagree (1 point). The instrument was validated for face and content validity by three experts, two from the Department of Early Childhood Care and Education and one expert from the Measurement and Evaluation unit of the Department of Educational Foundations at the Federal College of Education, Pankshin. Reliability was established using Cronbach's Alpha, with reliability coefficient of 0.87 which shows that the instrument is reliable. The research questions were analysed using the mean statistics where a mean score of 2.50 and above indicated agreed and a mean score below 2.50 indicated a disagreed.

Results

Research Question One: What are the importance of classroom environment on pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State?

Table 1: Mean Ratings of Respondents on the Importance of Classroom Environment on pupils learning of Mathematics in Pankshin Local Government Education Authority of Plateau State.

S/N	Importance of classroom environment on pupils learning of mathematics includes;	Mean	Decision
1	Helping to build pupils confidence in the subject	2.56	Agree
2	Helping to reduce math anxiety among pupils	2.79	Agree
3	Fostering pupils problem-solving skills in any mathematical concept	3.01	Agree
4	Improving pupils critical thinking in mathematics	2.88	Agree
5	Encouraging active learning and participation	2.50	Agree
6	Helping to develop spatial reasoning among pupils in the subject	2.65	Agree
7	Enhancing mathematical communication and collaboration among pupils	2.72	Agree
8	Helping pupils have better understanding and retention of any concept in mathematics	2.89	Agree
9	Increasing pupils' motivation and interest in mathematics	3.05	Agree
10	helping to improve pupils' math achievement and test scores	2.50	Agree
Cluster Mean		**2.75**	**Agreed**

Data analysis presented in table 1 shows the Mean responses of teachers on the importance of classroom environment on pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State. Items 1-10 were all agreed by respondents with mean ranging from 2.50 to 3.05. The grand mean of 2.75 shows that the respondent's agreed that classroom environment is important to pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State.

Research Question Two: What are the influence of classroom environment on pupil's engagement in Mathematics in Pankshin Local Government Education Authority of Plateau State?

Table 2: Mean Ratings of Respondents on the Influence of Classroom Environment on Pupils' Engagement in Mathematics in Pankshin Local Government Education Authority of Plateau State.

S/N	Influence of classroom environment on pupils' engagement in mathematics includes;	Mean	Decision
11	Making pupils to enjoy mathematics lessons	2.67	Agree
12	Helping pupils to answer questions in mathematics class	2.51	Agree
13	Pupils feel excited when solving mathematics problems in a well-arranged classroom	2.64	Agree
14	Enabling pupils pay attention when the teacher explains mathematics concepts	2.95	Agree
15	Classroom arrangements make pupils participate in mathematics activities	2.52	Agree
16	Helping pupils ask questions when they do not understand any concept in mathematics	2.37	Disagree
17	Pupils work on mathematics exercises by themselves when the classroom environment is well organized	2.39	Disagree
18	Helping pupils to collaborate with their classmates during mathematics group work	2.61	Agree
19	Making pupils to feel proud when they get correct answers in mathematics	3.01	Agree
20	Bringing about teacher-pupil relationship	2.55	Agree
21	Developing pupils confident to solve mathematics problems	2.85	Agree
22	Helping pupils use context in real world situation	2.47	Disagree
23	Providing hands-on activities and manipulative for pupils	2.59	Agree
24	Classroom environment gives pupils autonomy	2.50	Agree
	Cluster Mean	**2.61**	**Agreed**

Data analysis presented in table 2 shows the Mean responses of teachers on the influence of classroom environment on pupil's engagement in Mathematics in Pankshin Local Government Education Authority of Plateau State. Items 11, 12, 13, 14, 14, 18, 19, 20, 21, 23, and 24 were agreed by respondent with mean scores 2.67, 2.51, 2.64, 2.95, 2.52, 2.61, 3.01, 2.55, 2.85, 2.59 and 2.50 respectively as the influence of classroom environment on pupils' engagement in

mathematics. Items 16, 17 and 22 were disagreed by respondents with mean 2.37, 2.39 and 2.47 which are below the decision mean of 2.50. The grand mean of 2.61 shows that the respondent's agreed that classroom environment influences pupils' engagement in mathematics in Pankshin Local Government Education Authority of Plateau State.

Discussion of Findings

Findings of the study revealed that respondents agreed to the importance of classroom environment on pupils learning of mathematics in Pankshin Local Government Education Authority of Plateau State. Some of the importance are; it improves pupils critical thinking in mathematics, and it encourages active learning and participation among others. These findings tally with Ikegbusi, Egwu and Iheanacho (2021) who posits that the type of classroom environment that a teacher creates and encourages has a significant importance to either increase or decrease pupils' ability to learn and feel comfortable as a member of the class. They further posited that the classroom environment should as much as possible foster cooperation among pupils. Findings also agrees with that of Wang and Holcombe, (2020) who posits that a positive classroom environment that is rich in resources, supportive interactions, and effective instructional strategies fosters a sense of belonging and interest among pupils, leads to higher levels of engagement and motivation of pupils. It is therefore important that classroom learning environment should be well arranged and in good order in to improve teaching and learning of pupils and also increase pupils' engagement in mathematics.

Findings of the study also revealed that teachers agreed to the influence of classroom environment on pupils' engagement in mathematics in Pankshin Local Government Education Authority of Plateau State. The influence of classroom environment on pupils' engagement includes; it makes pupils enjoy mathematics lessons, it helps pupils to answer questions in

mathematics class, pupils feel excited when solving mathematics problems in a well-arranged classroom among others. This aligns with the findings of Baker et al. (2020), who posits that a well-maintained classroom environment significantly enhances pupils' engagement and academic performance. Similarly, Li, Lin and Wang (2020), posits that cooperative and collaboration have shown significant promise in promoting engagement, particularly in mathematics. This finding resonates with Newman, Alsharif and Tindal (2019), who posits that innovative and engaging instructional methods are essential to fostering a positive attitude toward Mathematics, especially among boys who may be experiencing external pressures that deter engagement. A well arranged and designed classroom environment will motivate pupils to learn as well as engage them in the classroom. Mathematics teaching will be interesting to the pupils with a good classroom environment. It is therefore, important that teachers take all of these into consideration when teaching pupils mathematics to create an interest in them as well as engage them into learning.

Conclusion

This study investigated the influence of the classroom environment on pupils' engagement in Mathematics within Pankshin LGEA, Plateau State. The findings indicate that classroom environment is important in teaching mathematics to pupils. Moreso, classroom environment influences pupil's engagement in mathematics. In summary, the classroom environment plays a crucial role in influencing pupils' engagement in Mathematics, and enhancing these conditions is essential for fostering positive attitudes and performance in Mathematics.

Recommendations

Based on the findings of this study, the following recommendations were made

1. Continuous professional development programs should be provided for teachers, focusing on effective classroom management and engaging instructional practices, as well as

training in emotional intelligence and the ability to recognize and address individual pupil needs to create a more inclusive learning environment.

2. Schools should actively engage parents and communities in supporting classroom environments by organizing workshops to educate parents about the importance of a conducive learning atmosphere and encouraging community involvement in school activities.

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