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Effects of flipped classroom teaching strategy on pupils' motivation and achievement in numeracy in nursery schools in Abuja, Nigeria

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ABSTRACT

The need for alternate teaching strategies in nursery schools in Nigerian federal capital territory triggered this study, the study investigated the effects of flipped classroom teaching strategy on Pupils' motivation in numeracy and achievement in nursery schools in Abuja Municipal Area Council (AMAC) Abuja, Nigeria. Two research questions and two hypotheses guided the study. The quasi-experimental research design was used for the study. The population of the study consisted of nursery two (2) pupils of 2022/2023 academic session of AMAC numbering 6,498. The sample size for the study consisted of 127 (51 Males and 76 Females) drawn from six intact classes in the six area councils. Simple random sampling was used to draw six intact classes from the six area councils in the F.C.T. Situation Motivation Scale (SMS) and Mathematics Achievement Test (MAT) were the instruments used for data collection. Cronbach Alpha formula was used to measure the internal consistency of (SMS), which yielded a reliability estimate of 0 .72. Kuder-Richardson formula 20 (K-R 20) determined the reliability of (MAT), which yielded a reliability estimate of 0.73. Mean, standard deviations and Analysis of Covariance (ANCOVA) were used to analyze the pre-test and post-test data and the research questions and hypotheses raised for the study. The analysis revealed that flipped classroom teaching strategy increased pupils' motivation and enhanced their achievement in numeracy more than the conventional method in FCT nursery schools in Nigeria. The study recommends that flipped classroom teaching strategy should be used in schools especially in nursery schools to enhance their motivation and achievement in numeracy.

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INTRODUCTION

Education is an indisputable tool in use to activate the development of developed and developing nations of the world. Developed nations of the world have used education to scientifically and technologically transform their nations. Education is the instrument used to transmit discoveries, ideas, skills, values, theories and research results to the young ones for continuity and to assist them fit into and make impact in the society. Muraina, and Oladimeji (2022) described education as a "socially organized and regulate process of continuous transference of socially significant experiences from previous to the following generations". It's a tool use by leaders of the world to advance science and technological advancement in nations. The development of any nation of the world is reliant on the skills and capability of its human resources. It is an indispensable instrument that equips citizens with the necessary skills for problem-solving skills and capacity which hitherto will lead to personal and national development (Ojonugwa, 2022).

The flipped classroom teaching approach is a contemporary pedagogical strategy that promotes the interchange of traditional homework and in-class activities. This method aims to equip learners with the upcoming lesson's content using technological tools, enabling them to familiarize themselves with the subject matter before engaging in classroom exercises and interactions. According to Karadag and Keskin (2017), the teaching style known as the flipped classroom involves the substitution of traditional homework assignments with in-class activities. Flipped classrooms include the transfer of learning activities from the traditional classroom setting to outside environments, with a focus on personalised instruction facilitated by technological tools. This platform provides students with options to obtain information for their upcoming classes. The flipped classroom teaching technique aims to achieve the contrary of the traditional teaching approach (Muraina et al., 2021). In traditional educational settings, instruction and teaching typically occur within the confines of the classroom, with learners being assigned homework to complete at home and subsequently submit for assessment. However, the flipped classroom teaching strategy challenges this conventional approach by advocating for a reversal of these roles. In this alternative approach, learners are provided with the learning materials in advance for independent study, while the classroom becomes the designated space for completing homework and engaging in collaborative activities.

Flipped learning is an instructional approach whereby students acquire theoretical knowledge outside of the conventional classroom setting, often at home, and afterwards engage in practical application of this knowledge inside the classroom. In accordance with the aforementioned statement, flipped learning may be defined as the pedagogical approach that involves the dissemination of class-related materials using online platforms, while assigning traditional homework tasks to be completed inside the physical classroom setting (Kara, 2015; Muraina et al., 2021). The flipped classroom teaching method is a pedagogical approach and framework within the realm of blended learning. Its objective is to shift the traditional classroom activities to the home environment via the use of technology, while simultaneously relocating the completion of homework tasks to the classroom setting. Azizah (2014) defines a flipped (or inverted) classroom as a kind of integrated learning where the traditional lecture component is moved outside of the classroom environment. This pedagogical strategy entails students obtaining novel information via online video lectures, often outside the confines of the classroom, while the conventional practice of completing assigned exercises at home has been substituted with in-class activities overseen by instructors. The primary objective of these activities is to provide students personalized guidance and promote more participation, in contrast to the traditional approach of lecture-based instruction. This instructional methodology is sometimes denoted as the "inverted classroom."

The flipped classroom methodology seeks to reverse the conventional structure of Bloom's Taxonomy. This suggests that students are involved in cognitive activities at a lower level, such as obtaining knowledge and understanding, outside the confines of the classroom. Meanwhile, they use their in-class time for cognitive tasks of a higher order, such as the application, analysis, synthesis, and evaluation of information. The flipped classroom instructional strategy pertains to an educational methodology whereby learning materials are sent to students outside of the traditional classroom setting, often inside their own residences. This approach requires students to familiarize themselves with the instructional content independently, while all other learning activities and

exercises are conducted inside the school setting. Typically, homework assignments that bear resemblance to one another are effectively resolved with the guidance of the instructor and collaboration with other students. The aforementioned approach facilitates a straightforward and effortless acquisition of knowledge. According to Mok (2014), the flipped classroom approach is often associated with the practice of pre-class film viewing. The picture of the flipped classroom is widely recognized as the most prevalent. If a definition were to be provided, it would include a wider range of concepts. The flipped classroom model may be succinctly described as a pedagogical approach where students engage with instructional content outside of class (homework) prior to attending in-person sessions where they actively participate in collaborative activities and get guidance from the instructor (lesson). According to Muraina et al. (2021), the flipped classroom encompasses more than just a teaching approach; it serves as a means for educators to deconstruct the content to be acquired and the manner in which it will be acquired. In accordance with the aforementioned claim, the flipped classroom model is regarded as a departure from traditional instructional approaches. In the conventional learning strategy, classwork is typically presented within the confines of the classroom, followed by in-class exercises.

Conversely, the flipped classroom model reverses this sequence, wherein students are first exposed to a brief video presentation by the teacher, covering the upcoming topic.The flipped classroom has been recognized as an instructional approach that promotes active learning and fosters creativity. In AlJaser's (2017) study, it was shown that flipped classrooms have a positive impact on the development and enhancement of cognitive abilities such as application, analysis, synthesis, and assessment. These skills, which are not often addressed in conventional curricula, are fostered and improved via the implementation of flipped classrooms. According to Mok (2014), this particular strategy resulted in the development of self-assurance and enhanced engagement with the material, hence creating more opportunities for interaction, learning, positive transformation, and a sense of accountability towards education. The flipped classroom technique incorporates two distinct learning approaches, namely the standard teaching strategy and the active learning method used inside the flipped classroom model. The characteristics associated with active learning in a flipped classroom setting may not be present in traditional teaching methods. The traditional approach to instruction incorporates the use of chalkboard presentations and teacher-centered instructional methods, which include the showing of learning materials on the board and the completion of accompanying activities. Darak (2018) asserts that the traditional technique is very prevalent in educational institutions around the globe. According to Muraina et al (2021), the traditional teaching approach is characterized by a teacher-oriented classroom, where lesson preparation and class activities primarily include the active participation of instructors and the passive participation of students. The conventional way of teaching is characterized by the use of the lecture approach, which is focused on directing and dictating the learning process. Typically, instructional sessions are conducted by educators who use a combination of visual aids, such as a whiteboard or blackboard, and spoken discourse to introduce and elucidate subject matter.

Following this, the instructor delegates assignments to the pupils, which are later accompanied by feedback supplied by the teacher. Mok (2014) posits that the conventional method comprises six teaching techniques often used in primary school settings. The list comprises many tactics, like the expressive strategy, copy strategy, directed and dictated strategy, pattern and racing approach, prepared outline strategy, and assigned topic strategy. The aforementioned traits exhibit a deficiency in incorporating active learning elements and may not effectively foster motivation within an educational setting. Motivation may be seen as an inherent impetus inside humans that compels them to initiate, sustain, and guide their behaviors in pursuit of certain goals. Motivation, as conceptualized by Ojonugwa (2022), encompasses the mechanisms via which individuals are prompted to engage in certain actions and exhibit corresponding behaviors in response to various stimuli, including events, objects, and activities, all of which are oriented towards the attainment of specific objectives. Motivation is a pivotal factor in the attainment of planned goals. Motivation, as described by Hamid and Muhammed (2012), refers to the process of enabling people to achieve higher levels of performance and overcome hurdles that impede growth. Motivation encompasses the cognitive and affective processes that serve to stimulate interest and foster the intrinsic drive to achieve certain objectives.

Motivation may be seen as the process through which an individual's will and interest are activated, sustained, and directed towards the achievement of a certain goal with increased fervor. Muraina et al. (2021) posit that motivation is a significant factor in determining an individual's performance in a particular undertaking. It serves as a catalyst that imbues individuals with the determination to complete tasks and ultimately accomplish their desired goals. Motivation encompasses the impetus behind an individual's actions, initiating and sustaining the activity with heightened intensity until the desired objectives are successfully achieved. Motivation may be seen as an intrinsic state marked by internal drives, forces, and strong impulses that impel people to begin, sustain, and intensify their behaviors until they achieve their specified goals, therefore fulfilling both personal and societal demands. According to the scholarly work of Muraina and Oladimeji (2022), motivation is a psychological construct that emerges from an individual's intrinsic longing for a certain object or outcome, and functions as a compelling impetus to consistently strive towards the fulfillment of that desire. Merely commencing an activity is inadequate; the underlying motivation for the action must be there in order to sustain the action and enhance the inclination in the presence of obstacles, until the specified goals are effectively achieved. According to Reamen (2016), there are many variables that might contribute to the enhancement of motivation. The author suggests that motivation is not a standalone phenomenon, but rather influenced by emotional states, curiosity, exploration, play, and learning. She also illustrated that variables such as the desire to work and learn, interest in the subject matter, general aspiration to succeed, conducive atmosphere, enough facilities, patience, and tenacity are all potential motivators that may ultimately contribute to the attainment of goals.

Achievement refers to the tangible results of educational endeavors, which are often evaluated by standardized or teacher-designed academic assessments, such as exams and examinations. Ojonugwa (2018) defines accomplishment as the realization of a predetermined objective after a systematic procedure and the implementation of specific actions designed to facilitate the fulfillment of such objective. According to Suvarna and Bhata (2015), academic accomplishment may be defined as the measurable results or performance that individuals attain in their educational pursuits. It serves as an indicator of the level to which individuals have successfully fulfilled certain objectives that were the central emphasis of their instructional experiences. The attainment of academic success necessitates the use of educational tools for its assessment. Various elements have been identified as influencing academic accomplishment. Bhatia (year) highlights several instances of these factors, including general intelligence, achievement motivation, recognition, interest, attitude, aptitude, and personality. Therefore, the academic progress of students is influenced by a multitude of elements, including their orientation, activities, and performance. According to Atchia and Chinapah (2019), many factors have been identified as influential in determining academic accomplishment within educational settings. These elements include socio-economic factors, school leadership, student characteristics, and teacher-related variables. In conjunction with the elements delineated by Muraina et al. (2021), it is noteworthy to consider that the pedagogical approach used by instructors across all disciplines, as part of the teacher-related factors, may have an influence on students' performance in a specific topic, particularly in the domains of mathematics and numeracy.

Statement of the Problem

The need to seek for alternative teaching strategy in schools become imperative because of the renewed challenges and needs in the educational system in the twenty first century. This becomes necessary also because of the review of curriculum contents and learning experiences. The conventional teaching strategy does not have the needed features that can facilitate the teaching and learning of the nascent teaching contents and learning experiences of this century (Muraina et al., 2021). Some of the features of conventional teaching strategy entails teacher centeredness, it encourages the supremacy of the teachers, memorization, the teacher is in full control of the class and others. It facilitates a situation where pupils are made to memorize the learning contents, alphabet, numbers, words and other learning contents making learning to be like a drama among children certain. The above is more with the public schools where the size of pupils are in high numbers.

The above scenario is contrary to the 21st-century teaching strategies with interactive qualities and designs that make learning concrete and practical in the nursery school system. some examples of these 21st-century

teaching strategies are differentiated instruction, collaborative learning, cooperative learning, flipped classroom, kinesthetic learning strategy and others. The above opposite scenario calls for this study to ascertain the effect of flipped classroom teaching strategy as against the conventional teaching method to determine its effect.

OBJECTIVES OF THE STUDY

The following objectives were formulated and guided this study;

1. To find out the differences in the value of numeracy mean motivation scores of pupils exposed to the "flipped classroom teaching strategy" and those exposed numeracy using the "conventional method".
2. To find out the differences in the value of numeracy mean achievement scores of pupils exposed to the "flipped classroom teaching strategy" and those exposed to the "conventional method".

HYPOTHESES

1. flipped classroom teaching strategy has no significant effect on pupils' motivation in numeracy as measured by their mean scores.
2. flipped classroom teaching strategy has no significant effect on pupils' achievement in numeracy as measured by their mean scores.

METHODOLOGY

The study adopted a quasi-experimental research design to determine the effect of flipped classroom teaching strategy (FCTS) on the motivation and achievement of nursery school pupils in numeracy. "Quasi experimental research design is that design that has features of experimental research but cannot be fully referred to as experimental research design. Quasi experimental research design includes the manipulation of participants in the experimental group without similar intervention for the control group" (Chiang, 2015).

Two teaching strategies were used for the study, the flipped classroom teaching strategy (FCTS) and the conventional method for nursery schools. Numeracy contents used for the study were drawn from the nursery school numeracy curriculum as provided by the FCT Universal Basic Education Board. The conventional method has identical learning objectives, contents and evaluation modes. The major difference with the learning procedure is that the flipped classroom teaching strategy (FCTS) required the manipulation of learning materials in small group activity-based teaching, while the conventional method used manual packages identical to that of the ", flipped classroom teaching strategy (FCTS)" for the same class. 'Flipped classroom teaching strategy (FCTS)' was used for the treatment group while the 'conventional method' was the method put to use for the control group.

Before the commencement of the study, subjects in both groups were pre-tested with the draft of the Situation Motivation Scale (SMS) and Numeracy Achievement Test (NAT). After the pre-test, the designed packages for which is the teaching of Numeracy began with teachers working strictly with the available instructional packages developed during the training session. The experiment was built into the normal school calendar in line with the school time table which lasted for four (4) weeks. The end of the experiment cleared the ground for post-test administration of the Situation Motivation Scale (SMS) and Numeracy Achievement Test (NAT) on the subjects in the experimental and control groups. Items in the post-test package were reshuffled after the pre-test otherwise, the content remained the same. Data collected from both the pre-test and post-test of the experimental and control groups were separated and analysed through the instrumentality of 'mean and standard deviation' for research hypotheses at an alpha level of 0.05 level of significance.

RESULTS

Hypothesis 1

1. H01: "flipped classroom teaching strategy (FCTS)" has no significant effect on 'motivation' in numeracy as measured by their mean score on SMS.

Table 1: Pre-testand post-test mean motivation numeracy scores of nursery school pupils taught using flipped classroom teaching strategy (FCTS) and those taught with the Convectional Method

Variable		Pre-test		Post-test		
Teaching strategies	N	$\bar{x}$	SD	$\bar{x}$	SD	Mean Gain
Flipped Classroom Teaching strategy	51	32.54	10.27	23.56	5.36	11.02
Conventional Method	76	32.21	10.23	22.82	5.24	10.61

The findings shown in Table 1 illustrate the average scores for pre-test and post-test numeracy motivation among pupils in a nursery school who were instructed using the "flipped classroom teaching strategy (FCTS)" compared to those who were taught using the 'traditional approach' (control group). The findings demonstrate that the average pre-test numeracy motivation scores of pupils who were instructed utilizing the "flipped classroom teaching strategy (FCTS)" (experimental group) were 2.54, with a standard deviation of 0.27. Additionally, the average post-test numeracy motivation score was 3.56, with a standard deviation of 0.36. The average increase in numeracy motivation mean scores, as measured between the pre-test and post-test, for participants who were taught utilizing the "flipped classroom teaching strategy (FCTS)" in the experimental group, was 1.02. The findings also indicate that the control group exhibited a pre-test numeracy motivation mean of 2.21, accompanied by a standard deviation of 0.23. Furthermore, the post-test mean for the control group was 2.82, with a standard deviation of 0.24. The average increase in numeracy motivation mean scores from the pre-test to the post-test in the control group was 0.61. In both the experimental and control groups, the mean scores for numeracy motivation in the post-test were higher than the mean scores in the pre-test. Specifically, the experimental group, which was taught using the "flipped classroom teaching strategy (FCTS)," had a stronger mean increase. This suggests that the use of the "flipped classroom teaching strategy (FCTS)" resulted in a greater enhancement of nursery school kids' motivation in numeracy compared to the traditional teaching technique.

Hypothesis 2

H_{02}: “flipped classroom teaching strategy (FCTS)” has no significant effect on pupils’ “achievement” in numeracy measured by their mean score on MAT.

Table 2: Pre-testand post-test mean achievement scores of numeracy achievement of nursery school taught using “flipped classroom teaching strategy (FCTS)” and those taught using the “conventional method”

Variable		Pre-test		Post-test		
Teaching strategies	N	$\bar{x}$	SD	$\bar{x}$	SD	Mean Gain
Flipped Classroom Teaching strategy	51	2.21	0.25	3.59	0,22	1.38
Conventional Method	76	2.20	0.23	2.51	0.26	0.30

The findings shown in Table 2 display the average accomplishment scores (pre-test and post-test) of numeracy in a nursery school setting, comparing the use of the "flipped classroom teaching strategy (FCTS)" to a control group. The findings indicate that the average accomplishment score (pre-test) of pupils in numeracy who were instructed utilizing the "flipped classroom teaching strategy (FCTS)" was 2.21, with a standard deviation of 0.25. Furthermore, the post-test average achievement score was 3.59, with a standard deviation of 0.22. There was a discrepancy of 1.38 in the average accomplishment scores of pupils in numeracy before and after being taught utilizing the "flipped classroom teaching strategy (FCTS)." According to Table 2, the control group exhibited a pre-test mean accomplishment score of 2.20, accompanied by a standard deviation of 0.23. Additionally, the post-test mean achievement score for the control group was recorded as 2.51, with a standard deviation of 0.26. There was a mean difference of 0.30 in the accomplishment scores of numeracy between the control group's pre-test and post-test. The results suggest that both the experimental and control groups showed better numeracy achievement scores

in the post-test compared to the pre-test. However, the experimental group, which was taught using the "flipped classroom teaching strategy (FCTS)", had a bigger mean improvement in achievement scores. The findings of this study indicate that the implementation of the kinesthetic learning strategy (KLS) resulted in greater improvement in numeracy performance among pupils compared to the standard instructional approach.

DISCUSSION

The findings of this research suggest that pupils who were exposed to the "flipped classroom teaching strategy (FCTS)" had more interest in numeracy and better academic accomplishment as compared to pupils who were exposed to the standard teaching technique. This statement aligns with the findings of a research conducted by Ezeudu and Gbendu (2022), which concluded that the use of a flipped classroom approach resulted in a notable improvement in pupils' attitudes towards the subject of Geography when compared to the traditional lecture style. The findings derived from this study are consistent with the research conducted by Makinde (2017), which demonstrated that the implementation of a flipped classroom approach led to enhanced academic achievement in the field of mathematics. The findings of this study align with the findings of Muraina et al. (2021), who observed statistically significant differences in the average scores on the academic achievement test attributed to the implementation of the flipped classroom teaching strategy. The experimental group of learners demonstrated higher scores compared to the control group. Additionally, significant variations were observed in the means of the motivation scale between the experimental and control group participants. The findings of this study align with the research conducted by Muraina et al (2021), which demonstrated a notable improvement in pupils' academic performance in government subjects with the use of the flipped classroom teaching technique.

The findings of Ganiyu (2022) align with the results of this research, indicating that NCE pupils achieved superior performance when instructed utilizing a flipped classroom package, as opposed to those taught by traditional teaching methods. The findings of this research align with those of Unamba et al. (2016), who observed that the implementation of the flipped classroom paradigm improves behavioral, emotional, cognitive, and agentic involvement, while also fostering active learning among pupils in the subject of algebra. According to Reamen (2016), motivation is influenced by several elements. The author suggests that motivation is not just derived from isolated circumstances, but rather is influenced by emotional states, curiosity, exploration, play, and learning.

CONCLUSION

Based on the available results as presented in all the tables above, the conclusions are as follows that: “flipped classroom teaching strategy (FCTS)” enhanced numeracy motivation among nursery school pupils more than the conventional method and “flipped classroom teaching strategy (FCTS)” improved numeracy achievement among nursery school pupils more than the conventional method.

RECOMMENDATIONS

In agreement with the result of this study and with conclusion drawn, the researchers in the have the following recommendations:

1. That instructional strategies that have interactive features like “flipped classroom teaching strategy (FCTS)” should be encouraged in schools especially in nursery school to enhance their motivation and achievement in numeracy.
2. That schools managed by the government and private other bodies should adopt activity-based teaching strategy, organize seminars for stakeholders and ensure that all schools embrace “flipped classroom teaching strategy (FCTS)” in Nigeria.
3. Teachers are encouraged to adapt “flipped classroom teaching strategy (FCTS)” in teaching nursery schools numeracy and other subjects and governments, private organizations including NGOS should take up the task of promoting “flipped classroom teaching strategy (FCTS)” to enhance pupils' motivation and achievement in numeracy in Nigerian nursery schools.

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