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# EFFECT OF ACTIVITY-BASED INSTRUCTIONAL STRATEGY ON PRIMARY SCHOOL PUPILS' ACHIEVEMENT IN MATHEMATICS IN AWKA SOUTH LOCAL GOVERNMENT EDUCATION AUTHORITY

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**Abstract**

The study investigated the effect of activity-based instructional strategy on primary school pupils' achievement in Mathematics in Awka South Local Government Education Authority. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. A quasi-experimental pre-test, post-test non-randomised control group research design was adopted for the study. The population of this study comprised all the basic five pupils in Awka South Local Government Education Authority, Anambra State. The sample for the study comprised 91 basic five pupils drawn using a multistage sampling procedure. An instrument titled the Mathematics Achievement Test (MAT) was used for data collection. The instrument was subjected to face validation by three experts: two from the Department of Early Childhood and Primary Education and one from the Department of Educational Foundations, all within the Faculty of Education at Nnamdi Azikiwe University. The content validation was established using the table of specifications. The reliability of the MAT was determined using the Kuder-Richardson formula 20 (KR-20), which yielded a reliability coefficient of 0.81. Mean and standard deviation were used to answer the research questions and Analysis of Covariance (ANCOVA) was used to test the hypotheses. The study's findings revealed, among other things, that pupils taught Mathematics using an activity-based instructional strategy achieved greater results than those taught using the expository teaching method in primary schools within the Awka South Local Government Education Authority. It was also found that there is a significant difference between the mean achievement scores of male and female pupils taught Mathematics using an activity-based instructional strategy in primary schools in Awka South Local Government Education Authority. Based on the findings, it was recommended among others that Mathematics teachers should integrate activity-based instructional strategy in teaching.

**Keywords:** Activity-Based, Instructional, Strategy, Primary School, Pupils, Achievement, Mathematics, Gender

## 1.1 Introduction

Scientific and technological advancement is crucial for the progress and development of any nation. One of the school subjects that plays a fundamental role in the scientific and technological advancement of society is mathematics. Mathematics is one of the core subjects in the basic school curriculum designed to improve the numeracy, problem-solving and reasoning skills of pupils. Mathematics is described by Agwu and Okigbo (2024) as the subject of figures or the science of size, quantity and figures. Mathematics is a practical subject that involves the

manipulation of numbers to solve a given problem. Mathematics is defined by Anyachebelu and Nnebuo (2020) as a subject that promotes logical thinking and the exploration of numerical figures in solving problems. Mathematics is a science subject concerned with the study of figures, values, and amounts, and their manipulation to navigate complex situations.

The teaching of Mathematics to pupils develops their creativity and analytical skills, helping them decode and use figures and facts to solve real-life problems. Undie, Ibok, Okon and Ani (2024) asserted that Mathematics provides pupils with problem-solving skills, logical thinking, and analytical skills that are essential for success in various fields. The teaching of Mathematics enables pupils to acquire skills to carry out operations such as addition, subtraction, division and multiplication of figures, which are very essential in their daily lives. In the same vein, Mbam and Olusanya (2025) noted that the teaching of Mathematics sharpens the minds of pupils, develops their logical thinking, enhances their reasoning ability, and improves their spatial power for effective management of situations in their immediate environment. Similar to this, Oyegoke, Ubani-Roberts, and Adubuola (2025) asserted that mathematics plays a crucial role in career choice and in understanding the changing world by improving pupils' ability to engage in logical reasoning, reflective thinking, creative thinking, and problem-solving. Furthermore, Oyegoke et al. asserted that this is why the Nigerian government has made Mathematics a compulsory subject at the primary and secondary levels of its educational system, as well as a prerequisite for all courses in its colleges of education, polytechnics, and universities. One of the basic requirements for studying any programme in higher institutions of learning is good academic achievement in Mathematics.

Academic achievement is closely tied to the results of tests and examinations administered to learners participating in teaching activities. According to Agwu and Okigbo (2024), academic achievement refers to the degree of attainment of students in learning tasks or the successful accomplishment of school programs. Academic achievement is the result obtained from tests and examinations, which reveal the knowledge acquired by pupils who have been exposed to instruction over a specific period. Academic achievement is a key parameter for determining the success of pupils in school programs. Okafor and Aniebo (2020) noted that academic achievement is one of the means of determining the level of attainment of specific learning goals in educational institutions. Ikwuka, Nwigwe, and Ekeh (2025) described academic achievement as the criterion for measuring the extent of students' knowledge acquisition, which is determined by scores, grades from tests, assignments, and examinations. Anyachebelu and Nnebuo (2020) noted that pupils consistently perform poorly in Mathematics in the Basic Certificate Examinations administered by the Awka South Local Government Education Authority, Anambra State. Continuing, Anyachebelu and Nnebuo stressed that a persistent drop in the academic achievement of pupils in mathematics may be attributed to several factors, which might include the expository teaching method.

The expository teaching method is commonly used by most teachers in teaching mathematics at basic school levels in Anambra State. Nnalue, Nnorom, and Christian-Ike (2021) noted that the expository method is a teacher-centered approach whereby lessons are presented using chalk and a chalkboard, with little or no explanation, while students passively listen and take notes. Continuing, Nnalue et al asserted that the expository method tends to make instructional activities very boring and monotonous to students in the classroom. The expository teaching

method involves teachers presenting and discussing a concept, while pupils listen, ask questions, and engage in discussion. Okoli et al (2024) noted that the expository teaching method encourages rote memorization of facts, which might not be capable of effecting meaningful learning, especially in mathematics. The teachers play a dominant role in the expository teaching method, who discourage active engagement of pupils in teaching and learning processes in the classroom. According to Anyachebelu and Nnebuo (2020), the expository teaching method involves an oral presentation of information to pupils with little or no active involvement or effort on their part. The teachers who apply the expository teaching method present their lessons with little or no consideration of individual differences among learners in the classroom. One way to cater to individual differences among pupils and encourage active participation in teaching and learning processes is through an activity-based instructional strategy (ABIS).

Activity-based instructional strategy is a learner-centered approach in which pupils engage in specific tasks during the teaching and learning processes in the classroom. According to Nwosu, Etiubon, and Ofem (2022), an activity-based instructional strategy is a child-centered technique that engages learners and involves them in the instructional process. Continuing, Nwosu et al. stressed that this instructional strategy supports differentiated learning (i.e., individual differences) and allows teachers to manage mixed-ability classes. An activity-based instructional strategy encourages pupils to be actively involved in classroom exercises. The teachers could use group projects, real-life scenarios, and classroom work to facilitate Activity-Based Learning in the classroom. Green (2024) noted that in an activity-based instructional strategy, teachers typically structure learning activities to encourage learners to work collaboratively in groups, gaining multiple perspectives and solutions to scientific challenges. Green added that through cooperative learning, students are empowered to formulate questions, exchange ideas, clarify concepts, experiment, brainstorm, and present solutions alongside their peers. Teachers who write mathematical equations on the board and call out pupils to solve them give an applied, activity-based instructional strategy. An activity-based instructional strategy can serve as supplementary exercises for assessing the level of understanding of the concepts taught to pupils, irrespective of their gender.

Gender is the socially, psychologically and culturally constructed roles, behaviours and attributes that distinguish males and females. Okafor, Ughamadu, and Enwezor (2024) defined gender as the patterns of behaviour, roles, and expectations associated with being male or female. Research undertaken on the basis of gender-related differences in academic achievement of pupils taught using an activity-based instructional strategy has yielded inconsistent results. Nwosu, Etiubon and Ofem (2022) reported that female students taught using an activity-based instructional strategy had higher mean achievement scores than their male counterparts. On the contrary, Green (2024) noted that there is no significant difference in the mean achievement scores of male and female students exposed to an activity-based instructional strategy. In the same vein, Omolafe, Okikiayo, and Eyiyemi (2024) found no significant difference in the academic performance of junior secondary school students taught mathematics concepts using an activity-based method, based on gender. There is a need for further studies to consider gender in an attempt to build new evidence on the effect of activity-based instructional strategies on primary school pupils' achievement in Mathematics in Awka South Local Government Education Authority.

### 1.2 Purpose of the Study

The purpose of this study was to determine effect of activity-based instructional strategy on primary school pupils' achievement in Mathematics in Awka South Local Government Education Authority. Specifically, the study seeks to determine:

1. Mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method in primary schools in Awka South Local Government Education Authority.
2. Mean achievement scores of male and female pupils taught Mathematics using activity-based instructional strategy in primary schools Awka South Local Government Education Authority.

### 1.3 Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method in primary schools in Awka South Local Government Education Authority?
2. What are the mean achievement scores of male and female pupils taught Mathematics using activity-based instructional strategy in primary schools Awka South Local Government Education Authority?

### 1.4 Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method in primary schools in Awka South Local Government Education Authority.
2. There is no significant difference between the mean achievement scores of male and female pupils taught Mathematics using activity-based instructional strategy in primary schools Awka South Local Government Education Authority.

## 2. Methods

A quasi-experimental design was adopted for the study. Specifically, it used a pre-test and post-test non-equivalent control group design. This design was chosen because the students were not sampled. The study took place at the Awka South Local Government Education Authority in Anambra State. The population comprised all the basic five pupils in this authority. The sample consisted of 91 basic five pupils selected using a multistage sampling procedure. In the first stage, two schools were selected using purposive sampling. The selection criteria required schools to be co-educational institutions with qualified teachers. In the second stage, simple random sampling was used to choose intact classes from each school. One class was assigned to the experimental group and the other to the control group. The experimental class (Group A) had 43 pupils (19 males and 24 females), while the control class (Group B) had 48 pupils (22 males and 26 females).

An instrument titled the Mathematics Achievement Test (MAT) was used for data collection. MAT had two sections: A and B. Section A generated information on pupils' biodata,

such as gender. Section B consisted of 25 multiple-choice questions with four options, labeled A-E, taken from Common Entrance Examination past questions. The instrument was face validated by three experts, two were from the Department of Early Childhood and Primary Education, and one was an expert in Measurement and Evaluation from the Department of Educational Foundations. All were from the Faculty of Education, Nnamdi Azikiwe University. The researchers provided the study title, purpose, research questions and hypotheses to the three experts which were subjected to face validation. The Content validation was determined using a table of specifications (Test blueprint). The MAT's reliability which was determined using the Kuder-Richardson formula 20, yielded 0.81.

The research assistants were mathematics teachers from the sampled schools, teaching pupils in the basic five. They were briefed and participated in the study. The MAT pre-test was conducted before the experiment began. After treatment, the items were renumbered and reshuffled, then administered again as a post-test. Mean and standard deviation were used to answer research questions. Analysis of covariance (ANCOVA) was used to test the null hypotheses at a 0.05 significance level. For each hypothesis, if the probability value (p-value) was less than or equal to 0.05, the null hypothesis was rejected. Otherwise, it was not rejected.

## 3. Results

**Research Question 1:** What are the mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method in primary schools in Awka South Local Government Education Authority?

**Table 1: Mean Pre-test and Post-test Achievement Scores of Pupils taught Mathematics using Activity-Based Instructional Strategy (ABIS) and that of those Taught Using Expository teaching method (ETM)**

| Method | N | Pretest Mean | Posttest Mean | Mean Gain | Pretest SD | Posttest SD |
|---|---|---|---|---|---|---|
| ABIS | 43 | 10.38 | 23.19 | 12.81 | 4.72 | 1.43 |
| ETM | 48 | 12.15 | 16.38 | 4.23 | 4.43 | 2.18 |

As shown in Table 1, the pretest mean achievement score of pupils taught Mathematics using activity-based instructional strategy was 10.38 with standard deviation of 4.72; their posttest mean achievement score was 23.19 with 1.42 value of standard deviation and 12.81 mean gain. The pretest mean achievement score of pupils taught Mathematics using expository teaching method was 12.15 with standard deviation of 4.23; their posttest mean score was 16.38 with 2.18 standard deviation and 4.43 mean gain. The mean achievement gain difference between pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method was 8.58 in favour of the experimental group. The spread of score in the posttest is more homogenous among pupils taught English Studies using activity-based instructional strategy because the SD scores is smaller (1.43) compared to the SD score (2.18) of those taught using expository teaching method. The results show that the pupils taught Mathematics using activity-based instructional strategy had greater achievement than those taught using expository teaching method in primary schools in Awka South Local Government Education Authority**.**

**Research Question 2:** What are the mean achievement scores of male and female pupils taught Mathematics using activity-based instructional strategy in primary schools in Awka South Local Government Education Authority?

**Table 2: Mean Pre-test and Post-test Achievement Scores of Male and Female Pupils taught Mathematics using Activity-Based Instructional Strategy (ABIS)**

| Gender | n | Pretest Mean | Posttest Mean | Mean Gain | Pretest SD | Posttest SD |
|---|---|---|---|---|---|---|
| Male | 19 | 11.10 | 19.21 | 8.11 | 3.77 | 1.23 |
| Female | 24 | 12.36 | 23.19 | 10.83 | 3.38 | 1.10 |

Result in Table 2 showed that the pretest mean achievement score of male pupils taught Mathematics using activity-based instructional strategy was 11.10 with standard deviation of 3.77; their posttest mean achievement score was 19.21 with 1.23 value of standard deviation and 8.11 mean gain. The pretest mean achievement score of female pupils taught Mathematics using activity-based instructional strategy was 12.15 with standard deviation of 3.38; their posttest mean score was 23.19 with 1.10 standard deviation and 10.83 mean gain. The mean achievement gain difference between male and female pupils taught Mathematics using activity-based instructional strategy was 2.72 in favour of the female pupils. The spread of score in the posttest is more homogenous among female pupils taught English Studies using activity-based instructional strategy because the SD scores is smaller (1.10) compared to the SD score (1.23) of their male counterparts. The results show that female pupils taught Mathematics using activity-based instructional strategy had slightly greater achievement than their male counterparts in primary schools in Awka South Local Government Education Authority**.**

**Hypothesis 1:** There is no significant difference between the mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using expository teaching method in primary schools in Awka South Local Government Education Authority.

**Table 3: ANCOVA on Difference between the Mean Achievement Scores of Pupils Taught Mathematics Using Activity-Based Instructional Strategy and that of those Taught Using Expository Teaching Method**

| Source of variation | SS | Df | MS | F | P-value | Decision |
|---|---|---|---|---|---|---|
| Corrected Model | 2651.092[a] | 2 | 1325.546 | 676.887 | .000 | |
| Intercept | 4327.765 | 1 | 4327.765 | 4554.232 | .000 | |
| Pretest | 5.765 | 1 | 5.765 | 2.322 | .000 | |
| Method | 3114.065 | 1 | 3114.065 | 321.986 | .000 | Sig. |
| Error | 929.160 | 90 | 10.324 | | | |
| Total | 42365.145 | 93 | | | | |
| Corrected Total | 2897.087 | 89 | | | | |

Table 3 showed that that at 0.05 level of significance, 1df numerator and 90 df denominator, the F-ration is 321.986 with Pvalue of 0.00 which is less than 0.05. Thus, the null hypothesis was rejected. Therefore, there is significant difference between the mean achievement scores of pupils taught Mathematics using activity-based instructional strategy and that of those taught using

expository teaching method in primary schools in Awka South Local Government Education Authority.

**Hypothesis 2:** There is no significant difference between the mean achievement scores of male and femle pupils taught Mathematics using activity-based instructional strategy in primary schools in Awka South Local Government Education Authority.

**Table 4: ANCOVA on Difference between the Mean Achievement Scores of Male and Female Pupils Taught Mathematics Using Activity-Based Instructional Strategy**

| Source of variation | SS | Df | MS | F | P-value | Decision |
|---|---|---|---|---|---|---|
| Corrected Model | 2192.574[a] | 2 | 1096.287 | 432.233 | .000 | |
| Intercept | 3654.209 | 1 | 3654.209 | 4369.220 | .010 | |
| Pretest | 7.535 | 1 | 7.535 | 3.454 | .007 | |
| Gender | 4035.908 | 1 | 4035.908 | 289.11 | .021 | Sig. |
| Error | 700.830 | 90 | 7.787 | | | |
| Total | 5433.6754 | 93 | | | | |
| Corrected Total | 4443.876 | 89 | | | | |

Table 4 showed that that at 0.05 level of significance, 1df numerator and 90 df denominator, the F-ration is 289.11 with P-value of 0.21 which is greater than 0.05. Thus, the null hypothesis was rejected. Therefore, there is significant difference between the mean achievement scores of male and female pupils taught Mathematics using activity-based instructional strategy in primary schools in Awka South Local Government Education Authority.

## 4. Discussion

The result of the study showed that pupils taught Mathematics using an activity-based instructional strategy had greater achievement than those taught using the expository teaching method in primary schools in Awka South Local Government Education Authority**.** This supported the finding of Omolafe, Okikiayo, and Eyiyemi (2024), which revealed that students taught mathematics using an activity-based instructional strategy had higher mean achievement scores than those taught with a conventional teaching method. This also upheld the finding of Green (2024) which showed that learners taught using an activity-based instructional strategy outperformed their counterparts taught using an expository teaching method. This finding could be explained by the fact that an activity-based instructional strategy arouses and sustains the attention of pupils, thereby increasing their understanding of Mathematical concepts taught in the classroom. Pupils exposed to instruction through an activity-based strategy are more likely to remember mathematical concepts when they actively participate in the teaching process. Further results indicated that there is a significant difference between the mean achievement scores of pupils taught Mathematics using an activity-based instructional strategy and of those taught using the expository teaching method in primary schools in Awka South Local Government Education Authority. This finding aligns with Green's (2024) research, which revealed a significant difference in the academic achievement of students exposed to an activity-based instructional strategy compared to those taught using the expository technique. The practical nature of the activity-based instructional strategy may be responsible for the significant difference in mean

scores of pupils taught with this approach compared to the conventional teaching method. An activity-based instructional strategy addresses the diverse learning styles of pupils, which may be responsible for the significant difference in mean achievement scores compared to those taught using the expository teaching method.

The finding of the study revealed that female pupils taught Mathematics using an activity-based instructional strategy had slightly greater achievement than their male counterparts in primary schools in Awka South Local Government Education Authority**.** An activity-based instructional strategy might be the preferred learning style of female pupils, which could enable them to achieve slightly greater academic success than their male counterparts in primary schools within the Awka South Local Government Education Authority**.** This finding aligns with that of Nwosu, Etiubon, and Ofem (2022), who reported that female students taught using an activity-based instructional strategy achieved higher mean scores than their male counterparts. It was also found that there is a significant difference between the mean achievement scores of male and female pupils taught Mathematics using an activity-based instructional strategy in primary schools in Awka South Local Government Education Authority. This finding concurred with Green's (2024) study, which showed that there is no significant difference in the mean achievement scores of male and female students exposed to an activity-based instructional strategy. This finding aligns with Omolafe, Okikiayo, and Eyiyemi's (2024) study, which revealed no significant difference in the academic performance of junior secondary school students taught mathematics concepts using an activity-based method, based on gender. This disagrees with the finding of Nwosu, Etiubon, and Ofem (2022), which showed that the mean achievement scores of male and female students taught using an activity-based instructional strategy did not significantly differ. The difference in time span could account for the disagreement between the findings. Activity-based instructional strategy is an inclusive teaching approach as it does not favour one gender over the other.

## 5. Conclusion

Based on the findings, it was concluded that the activity-based instructional strategy is an effective approach for improving pupils' achievement in Mathematics in primary schools in Awka South Local Government Education, Anambra State. The activity-based instructional strategy outperforms the expository method for teaching Mathematics in these schools.

## 6. Recommendations

Based on the findings, the following recommendations were made:

1. Mathematics teachers should use activity-based instruction.
2. Basic school curriculum developers should develop modules that support the integration of an activity-based instructional strategy in teaching mathematics.

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