

**Effects of Class-wide Peer Tutoring and Problem-solving Strategies on Federal Colleges of Education Students' Academic Achievement in Algebraic Expressions in Southwest, Nigeria**

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**Being a PhD Thesis in the Department of Science Education, Faculty of Education, Lead City University, Ibadan, Oyo State, Nigeria**

**In Partial Fulfilment of the Requirements for the Award of Doctor of Philosophy (PhD)  
Degree in Mathematics Education**

### **Certification**

This is to certify that Oluwafunmike Oyenike EZEKIEL with the Matriculation Number LUC/PG/000891 carried out this research work titled “Effects of class-wide peer tutoring and problem-solving strategies on Federal Colleges of Education students’ academic achievement in Algebraic expressions in Southwest, Nigeria” in the Department of Science Education, Faculty of Education, Lead City University, Ibadan, Oyo State, Nigeria for the award of Doctor of Philosophy (PhD) Degree in Mathematics Education and that this has not been previously submitted to any institution for the award of Degree of Certificate.

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Date

## **Dedication**

This work is dedicated to the Almighty God, Dr. Olubiyi Johnson Ezekiel (My Husband), Inioluwa, Anuoluwa, Ore-Ofe and Ololade (My Children) and my late father Pa. Solomon OyedareAtoyebi.

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## Abstract

Students' achievements in Algebraic expressions concept as a course under Basic General Mathematics II for students in all Federal Colleges of Education, Nigeria over the years have not been encouraging. This may be due to factors like large class-size, crowded classrooms, misinterpretation of word problems, gender differences, students' attitude and interest in the course, teaching methodologies employed by the lecturers and other factors. Many scholars had worked on class-wide peer tutoring but not many have worked on the combined effects of problem-solving strategy hence this study determined effects of class-wide peer tutoring and problem-solving strategy on Federal Colleges of Education students' academic achievement in Algebraic expressions in Southwest, Nigeria. The population for the study comprised all the 100 level Students in Federal Colleges of Education Southwest, Nigeria. A random sampling technique was used to select 380 students for the study. Three research instruments were used: Algebraic Expressions Concept Students' Academic Achievement Test (AECSAAT) (KR20=0.87), Questionnaire on Students' Attitude (QSA) ( $r=0.76$ ) and Lesson Plan Format (LPF). Seven hypotheses were formulated and tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. The results showed that there was a significant main effect of class-wide peer tutoring, problem-solving and conventional strategy on students' academic achievement in Algebraic expressions ( $F_{(2, 379)}=352.161$ , partial,  $\eta^2=0.653$ ); there was a significant main effect of gender on students' academic achievement in Algebraic expressions ( $F_{(1, 379)}=0.002$  partial,  $\eta^2=0.200$ ); there was a significant main effect of class-size on students' academic achievement in Algebraic expressions ( $F_{(2,379)}=352.161$  partial,  $\eta^2=0.653$ ); there was no significant interaction effect of class-wide peer tutoring, problem-solving, conventional strategies and gender on students' academic achievement in Algebraic expressions ( $F_{(2,379)}=352.161$  partial,  $\eta^2=0.002$ ); there was no significant interaction effect of class-wide peer tutoring, problem-solving, conventional strategies and attitude on students' academic achievement in Algebraic expressions ( $F_{(2, 379)} = 0.563$  partial,  $\eta^2=0.003$ ); there was no significant interaction effect of gender and attitude on students' academic achievement in Algebraic expressions ( $F_{(1, 379)} = 1.135$  partial,  $\eta^2=0.003$ ) and there was no significant interaction effect of class-wide peer tutoring, problem solving, conventional strategies, gender and attitude on students' academic achievement in Algebraic expression ( $F_{(2, 379)} = 1.433$  partial,  $\eta^2=0.008$ ). It was concluded that class-wide peer tutoring and problem-solving strategies improved students' academic achievement in Algebraic expressions concept. It was recommended among others that class-wide peer tutoring and problem-solving strategies should be adopted by teachers of Mathematics.

**Keywords:** Class-wide peer tutoring, Problem-solving strategy, Algebraic expressions, Students' academic achievement

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## List of Acronyms

<b>Abbreviation</b>	<b>Meaning</b>
<b>CWPT</b>	Class-wide Peer tutoring
<b>PSS</b>	Problem-solving Strategies
<b>FCESN</b>	Federal Colleges of Education Southwest, Nigeria
<b>NPE</b>	National Policy on Education
<b>NMC</b>	National Mathematical Centre
<b>NCE</b>	Nigeria Certificate in Education
<b>NCCE</b>	National Commission for Colleges of Education
<b>UBE</b>	Universal Basic Education
<b>GSE</b>	General Studies Education
<b>BGM</b>	Basic General Mathematics
<b>TIMSS</b>	Trends in Mathematics and Science Study
<b>STEM</b>	Science, Technology, Engineering and Mathematics
<b>FCE</b>	Federal Colleges of Education
<b>HA</b>	High Achievement
<b>LA</b>	Low Achievement
<b>SAA</b>	Student Academic Achievement
<b>JAMB</b>	Joint Admission Matriculation Board
<b>PISA</b>	Programme for International Student Association
<b>SCTEEP</b>	Study Centre of Testing, Evaluation and Educational Policy
<b>BODMAS</b>	Bracket of Division, Multiplication, Addition and Subtraction
<b>PEMDAS</b>	Proficient Expression in Multiplication, Division Addition and Subtraction
<b>SPT</b>	Structured Peer tutoring
<b>PALS</b>	Peer Assisted Learning Strategies
<b>SAPT</b>	Same Age Peer Tutoring
<b>CWPT</b>	Collaborative Work Peer Tutoring
<b>ADHD</b>	Attention Deficit Hyperactivity Disorder
<b>ELL</b>	English Language Learning
<b>ZPD</b>	Zone of Proximal Development

<b>EPA</b>	Explain, Practice and Assess
<b>PBL</b>	Problem Based Learning
<b>CLT</b>	Cognitive Load Theory
<b>EMPST</b>	Electricity Mathematical Problem Solving Test
<b>ANCOVA</b>	Analysis of Covariance
<b>MAT</b>	Mathematics Achievement Test
<b>LN</b>	Lesson Notes
<b>BST</b>	Basic Skill Test
<b>PST</b>	Problem Solving Test
<b>AAS</b>	Algebraic Attitude Scale
<b>PMRI</b>	Pendidikan Matematika Realistik Indonesia
<b>OEA</b>	Open Ended Approach
<b>RiMEA</b>	Research in Mathematics Education in Australasia
<b>NCTM</b>	National Council of Teachers of Mathematics
<b>OB</b>	Oaxaca-Blinder
<b>MOT</b>	Mathematics Objective Test
<b>MPQ</b>	Mathematics Perception Questionnaires
<b>WHSMAPT</b>	Western High School Mathematics Academic Proficiency Test
<b>PPSMB</b>	Post Primary School Management Board
<b>RQ</b>	Research Question
<b>ALHPS</b>	Active Learning Heuristic Problem Solving