

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

Oluwafunmike Oyenike EZEKIEL
LCU/PG/000891

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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.

.....
Professor P.O. Yara

Supervisor

.....
Date

.....
Professor P.O. Yara

Head of Department

.....
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

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

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