

**Effects of Two Modes of Laboratory Teaching Strategy on Achievement of Senior
Secondary Chemistry Students in Volumetric Analysis in Ondo State, Nigeria**

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Education, Lead City University, Ibadan, Oyo State, Nigeria**

**In Partial Fulfilment of the Requirements for the Award of Master of Science
Education Degree (MSc Ed) in Chemistry Education**

Certification

This is to certify that Ola Benson ODOFIN with Matriculation Number LCU/PG/006089 carried out this research work titled Effects of Two Modes of Laboratory Teaching Strategy on Achievement of Senior Secondary Chemistry Students in Volumetric Analysis in Ondo State, Nigeria in the Department of Science Education, Faculty of Education, Lead City University, Ibadan, Oyo State, for the award of Master of Science Education Degree (MSc (Ed)) in Chemistry Education and that this has not been previously submitted to any institution for the award of degree or certificate.

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Dedication

This research work is dedicated to God Almighty, the giver of knowledge, wisdom and understanding

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Abstract

Students results in Chemistry over the years as observed by the researcher in secondary schools in Ondo North senatorial district of Ondo State in the aspect of Volumetric analysis have not been encouraging as student struggle to comprehend abstract volumetric concepts. This study determined the effect of improvised and virtual laboratory teaching strategies on Chemistry students' achievement in Volumetric Analysis in Ondo North. Three hypotheses were formulated and tested at 0.05 level of significant. the pretest- posttest quasi-experimental design was adopted. A total of 114 Chemistry students, comprising 62 male and 52 female participants, took part in this study. Volumetric Analysis Achievement Test (KR-20 = 0.89) and Guides for Instruction in Teaching and Learning of Volumetric Analysis were used as instruments for data collection. Analysis of Covariance (ANCOVA) was used for data analysis. There was a significant main effect of treatment on Achievement in Volumetric analysis among Chemistry students in Ondo North, ($F_{2,110} = 422.07$, $p < 0.05$, There was no significant main effect of gender on Achievement in Volumetric Analysis among Chemistry students in Ondo North, ($F_{1,111} = 0.78$, $p > 0.05$. There was no significant interaction effect of treatment and gender on Achievement in Volumetric Analysis among Chemistry students in Ondo North Senatorial District of Ondo State, $F_{2,107} = 0.12$, $p > 0.05$ The study concluded that Volumetric Analysis using improvised and virtual laboratories teaching strategies had significant effects on students' achievement. It was therefore recommended that teachers should make use of improvised and virtual laboratory teaching strategies to teach volumetric analysis at the senior secondary school level.

Keywords: Improved teaching strategy, Virtual laboratory teaching strategy, Achievement in Volumetric Analysis,

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List of Acronyms

Abbreviation	Meaning
STEM	Science, Technology and Mathematics
VAAT	Volumetric Analysis Achievement Test
WAEC	West African Examination Council
NECO	National Examination Council
VR	Virtual Reality
LABS	Laboratories
ILS	Improvised Laboratory Strategy
VLS	Virtual Laboratory Strategy
Ho	Hypotheses
PHET	Physics Education Technology
KR- 20	Kuder – Richardson 20
ANCOVA	Analysis of Covariance
SS2	Senior Secondary School 2
GILTVA	Guide for Instruction of Laboratory Teaching of Volumetric Analysis

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