

DE LA SALLE UNIVERSITY

THE EFFECTS OF TEACHING METHODS AND COGNITIVE STYLES
ON STUDENTS' ACHIEVEMENT IN PLANE TRIGONOMETRY

A Dissertation

Presented to

The Faculty of the Graduate School

Department of Science Education

College of Education

De La Salle University

Manila

In Partial Fulfillment of the

Requirements for the Degree

Doctor of Philosophy in Science Education

(Mathematics)

by

Concepcion J. Asuncion

May, 1991

AKLATANG EMILIO AGUINALDO



DE LA SALLE UNIVERSITY

TABLE OF CONTENTS

	PAGE
Title Page	i
Approval Sheet	ii
Acknowledgement	iii
List of Tables	viii
Abstract	ix
CHAPTER	
I. THE PROBLEM	1
Introduction	1
Theoretical Framework	5
Statement of the Problem	13
Hypotheses	15
Assumptions	15
Importance of the Study	16
Scope and Delimitation of the Study	17
Definition of Terms	18
II. REVIEW OF RELATED LITERATURE	21
On Teaching Methods and Achievement	21
On Learning Style and Achievement	28
On Teaching Methods, Learning Style, and Achievement	32
Summary	41



DE LA SALLE UNIVERSITY

III.	METHODOLOGY	43
	Research Design	43
	Setting of the Study	47
	The Subjects	49
	Profile of the Subjects	51
	Instruments	52
	Treatment of Data	57
IV.	PRESENTATION, ANALYSIS, AND INTER- PRETATION OF DATA	58
	The Students' Cognitive Style	58
	Distribution of Data	59
	Correlation Analysis	61
	Analysis of Covariance	63
	Summary of Findings	73
V.	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	77
	Summary	77
	Findings of the Study	80
	Conclusions	82
	Recommendations	82
	BIBLIOGRAPHY	84



DE LA SALLE UNIVERSITY

APPENDICES	90
A. Letter to the Evaluators of the Content Validity of the Proposed Achievement Test	91
B. A Questionnaire for the Establishment of the Content Validity of the Proposed Achievement Test	92
C. Letter of Request for Permission to Validate the Proposed Achievement Test	94
D. Letter of Request for Permission to Conduct the Experimental Study	95
E. Content Validity Ratings of Evaluators	96
F. Table of Specifications on the Content and Skills in Plane Trigonometry	97
G. Item Analysis	98
H. Achievement Test in Plane Trigonometry	100
I. Sample Study Guide	109
J. Observer's Evaluation Questionnaire	118
K. Observer's Evaluation	120
CURRICULUM VITAE	121



DE LA SALLE UNIVERSITY

LIST OF TABLES

TABLE	PAGE
1. Distribution of Subjects by Teaching Methods and Cognitive Styles	46
2. Number of Subjects and Class Schedule	50
3. Distribution of Treatments	51
4. Frequency Distribution and Percentage of Subjects According to Their Cognitive Styles	59
5. Means and Standard Deviations of Scores on the Pretest, Mental Ability Test and Posttest	60
6. Correlation Between the Posttest and the Independent Variables	62
7. Unadjusted and Adjusted Means on the Achievement Test by Cognitive Style Group	64
8. Unadjusted and Adjusted Means on the Achievement Test by Teaching Method Group	66
9. Unadjusted and Adjusted Means on the Achievement Test by Cognitive Style and Teaching Method	68



DE LA SALLE UNIVERSITY

ABSTRACT

Title : The Effects of Teaching Methods and Cognitive Styles on Students' Achievement in Plane Trigonometry

Researcher : Concepcion J. Asuncion
School : De La Salle University
Subject Area : Mathematics
Degree Conferred : Doctor of Philosophy in Science Education
Major in Mathematics

The Problem

This exploratory study was designed to investigate the integrated effects of teaching methods and cognitive styles on student achievement in Plane Trigonometry. The two teaching methods, namely, the reinforced-lecture method and the lecture-only method, were compared in light of the differing cognitive styles of the students classified as Sensing and Intuition as measured by the Myers-Briggs Type Indicator. Specifically, the study sought to answer the following questions:



DE LA SALLE UNIVERSITY

1. How do the achievement scores of the students compare when grouped according to their cognitive style?

2. How do the achievement scores of the students compare when grouped according to the methods of teaching?

3. Is there an interaction between the students' cognitive styles and instructional methods?

The Methodology

A quasi-experimental design with non-equivalent groups involving four-experimental classes was used to test the hypotheses. Two sections were used as experimental groups with the reinforced-lecture method. Two other sections were used as control groups with the lecture-only as the mode of instruction.

The study was conducted at the Nueva Vizcaya State Institute of Technology, Bayombong, Nueva Vizcaya during the first half of the second semester of school year 1990-1991. The sample population consisted of 100 first year college students with different courses.

The researcher handled all the classes with the



DE LA SALLE UNIVERSITY

lecture method as the teaching procedure. However, the experimental groups were provided with study guides and audiovisuals.

The four groups were given the pretest, the Otis-Lennon School Ability Test and the Myers-Briggs Type Indicator, at the start of the experiment. After seven weeks of instruction, the posttest was administered to measure the achievement of the students in Plane Trigonometry.

For statistical treatment, analysis of covariance procedures were utilized with the pretest and IQ raw scores as covariates.

Findings of the Study

The following findings were drawn from the analysis of covariance:

1. There was no significant difference in the achievement scores between the sensing type of students and the intuitive type of students. However, the intuitive students tend to achieve better than the sensing students.



DE LA SALLE UNIVERSITY

2. There was a significant difference in the achievement scores between the students under the reinforced-lecture method and the lecture-only method. Students who were taught with the reinforced-lecture method achieved higher scores than the students who were taught with the lecture-only method.

3. There was a significant interaction between the students' cognitive style and the teaching methods. The sensing students tend to achieve higher scores under the reinforced-lecture method. On the other hand, the intuitive students performed equally well under the two instructional methods.

Recommendations

In the light of the findings, the researcher recommends the following:

1. There is a need to adjust trigonometry instruction to assist the sensing type of students since they tend to achieve less than the intuitive type of students.

2. The study guide and the use of the overhead



DE LA SALLE UNIVERSITY

projector helped adjust the achievement scores of the sensing type of students. It is, therefore, recommended that these be used to complement the lecture method. Other approaches such as the mathematics laboratory and small group study could be used to reinforce the lecture.

3. Similar studies should be conducted using different samples from different learning institutions so that more general conclusions can be formulated.

