# PROMOTION OF STUDENTS' ACHIEVEMENT IN GEOMETRY USING VAN HIELE MODEL IN SECONDARY LEVEL

A

## **THESIS**

 $\mathbf{BY}$ 

### RAMESHWAR PRASAD JOSHI

**SYMBOL NO. 281184** 

FOR THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER'S IN MATHEMATICS EDUCATION

## **SUBMITTED**

TO

DEPARTMENT OF MATHEMATICS EDUCATION

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS

TRIBHUVAN UNIVERSITY

KIRTIPUR, KATHMANDU

NEPAL, 2021

# TABLE OF CONTENTS

Letter of Approvali
Letter of Certificateii
Copyrightiii
Dedicationiv
Declarationv
ACKNOWLEDGEMENTSvi
ABSTRACTvii
TABLE OF CONTENTSviii
CHAPTER I INTRODUCTION1-5
Background of the Study1
Statement of the Problem
Rationale of the Study4
Objectives of the study4
Delimitations of the study4
Definitions of the related terms5
CHAPTER II REVIEW OF LITRRATURE6-19
Empirical Literature6
Theoretical Literature9
Van Hiele Model of Geometry Thinking
Properties of Van Hiele Level
Conceptual Framework

CHAPTER III METHOD AND PROCEDURES	20-23
Design of the Study	20
Population of the Study	20
Sample of the Study	20
Tools of the Study	21
Reliability and validity of tools	21
Date and collection procedure	22
Date Analysis Procedure	22
CHAPTER IV ANALYSIS AND INTERPRETATION OF DATA	
Documents Analysis	24
Syllabus of Grade Nine  Past Geometry Examination Questions	
Analysis of the Van Hiele Geometry Test Result	28
Analysis of Clinical Intreview	34
Exploratory Analysis	34
Defining Shape Task.	36
Sorting by Class Inclusion Task.	38
CHAPTER V FINDING CONCLUSION AND IMPLICATION	40-43
Finding	40
Conclusion.	
Implication	42
References	
Appendix A	
Appendix B	
Appendix C	
Appendix D	
Appendix E	

# LETTER OF APPROVAL

This thesis entitled **Promotion of students' Achievement in Geometry Using Van Hiele Model in Secondary Level** submitted by Mr. Rameshwar Prasad Joshi is partial fulfillment of the requirements for the Master's degree in Education has been approved.

Committee for Viva-Voce	<u>Signatures</u>
Pro. Dr. Bed Raj Acharya	
(Chairman)	
Asssoc. Prof. Rajendra Kunwar	
(External)	
Mr. Krishna Prashad Bhatt	
(Supervisor)	

Date: 30 March 2021



Mr. Krishna Prashad Bhatt

Date: 17 March 2021

(Supervisor)

# त्रिभुवन विश्वविद्यालय शिक्षा शास्त्र केन्द्रीय विभाग

# गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस कीर्तिपुर, काठमाडौँ, नेपाल

UNIVERSITY CAMPUS Kirtipur, Kathmandu, Nepal

Prof. Dr. Bed Raj Acharya

(Head)

# TRIBHUVAN UNIVERSITY CENTRAL DEPARTMENT OF EDUCATION DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-	मितिः
Ref.	Date:
LETTER OF CERTIFICATE	
This is to certify that Mr. Rameshwar Prasad Joshi, students of academ	nic year 2068/070 with
campus Roll No.2645(2068) & 2621(2070), Exam Roll No. 281184 (a	cademic Year 2070)
and T.U. Registration No.: 6 - 1 - 329 -103 -2003 has completed his th	esis under supervision
of Mr. Krishna Prashad Bhatt during the period prescribed by the rule	and regulations of
Tribhuvan University, Nepal. The thesis entitled "Promotion of Stude	ents' Achievement in
Geometry Using Van Hiele Model in Secondary Level" has been pr	repared based on the
results of his investigation conducted during the period of January 202	21 to March under the
Department of Mathematics Education, University Campus, Tribhuvan	University, Kirtipur,
Kathmandu. His thesis number is 1596. I recommend and forward his	thesis for evaluation a
the partial requirement to award the Degree of Master of Education.	

Phone No.: 977-1-4331337 / 4333229, Fax No.: 4334955, E-mail : foe@tucded.edu.np, Website : tucded.edu.np

# ©2021

By

# Rameshwar Prasad Joshi

This document is copyright material under law, no parts of this document may be reproduced without the expressed permission of the Researcher,

Defence Date:

All Right Reserved.

# **DECLARATION**

This thesis contains no material which has been submitted for the award of other degree in any institution. To the best of my Knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

.....

Date: 30 March 2021 Rameshwar Prasad Joshi

# **DEDICATION**

This study is dedicated to

my affectionate parents Mr. Nav Raj Joshi and
late. Mrs. Dhawala Devi Joshi who gave me grandeur opportunity

to step in this earth and respected all my teachers; my wife Sushila Pandey;
sister Dipa Joshi; brother Bhubaneshwar Joshi; uncle Manoj Joshi; all my family
members and all persons who support, love, care and sacrifice a person who I am now.

### **ACKNOWLEDGEMENT**

I would like to thanks the Department of Mathematics Education and Central Department of Education, Kirtipur for providing me an opportunity to carry out this research work. I am highly grateful to my supervisor Mr. Krishna Prashad Bhatt for his continuous guidance, creative suggestion, encouragements, inspiration and generous remarks to complete this thesis on time. His valuable suggestion and instruction have supported me from selection of the problem till the completion of this thesis.

My sincere appreciation goes to Prof. Dr. Bed Raj Acharya, Head of Department of Mathematics Education, TU Kirtipur for his helpful suggestion, support, inspiration and encouragement during this study. I am also very much indebted to all of school families which were selected for study for their sweet cooperation and provide opportunity for the collection of data.

Finally, I am also thankful to my parents, family, friends, teaching staffs of Shree Kailpal Secondary School Paniut, Bhaheshwor 1 who associated directly or indirectly supported me. I would like to express my appreciation to University Computer and Photocopy Service, Kirtipur for his help in printing and organizing of my research.

Rameshwar	Prasad	Joshi

### **ABSTRACT**

This thesis is entitled "Promotion of Students' Achievement in Geometry Using Van Hiele Model in Secondary Level". The objectives of this study were to dig out the level of mathematics students of secondary level compared with Van Hiele model and to explore to attitude of the students about Van Hiele model of teaching geometry at grade nine.

The design of the study is mixed research design. Two government school were selected by purposive sampling. The respondents of this study were all students of grade 9 from selected two school. To collect data, the researcher used document analysis, Van Hiele Geometry Test, and clinical interview as research tool. The researcher analyzed geometry syllabus of grade nine and past geometry yearly examination questions in document analysis.

The research from the study indicated that many of the selected school students who participated in the research have a weak conceptual understanding of geometric concept. Most of the students were functioning at Van Hiele level 0 and 1. The students who participated in the study were functioning at a level that do not fit with their mathematics curriculum. There were better performance of school B than school A.

Researcher found the condition that some students wrote the correct answer of upper level without answering the previous level. Through the interview it was found that this condition arises due to the rote learning, guessing, learning rules or definitions by rote or by applying routine algorithms that they didn't understand. The main challenge found by this research study was that the participants lacked conceptual understanding of geometric concepts. The teaching and learning of geometry should be conduct program to improve result. When teaching about geometric shapes and concepts, teacher should ensure that the proper geometric terminologies are used by both teacher and students. Students can only recognize, describe and distinguish geometric shapes from each other by knowing their properties. Teacher should focus to student to study the structure of geometry, student should be self-motive to learn geometry, generate rules and regulation side of school, student and teacher to promote the achievement in geometry.