MISCONCEPTIONS OF STUDENTS IN LEARNING MATHEMATICS AT PRIMARY LEVEL

Rana Ghulam Mohyuddin

ID# 050193006

DEPARTMENT OF EDUCATION

SCHOOL OF SOCIAL SCIENCES AND HUMANITIES

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

LAHORE 2012

ABSTRACT

This study intended to investigate misconceptions and errors commonly made by the students at primary level, finding out the reasons for these misconceptions and designing a remedial intervention for removing these misconceptions. The following research questions were developed to accomplish the task:

- What are the misconceptions of students in learning mathematics at primary level?
- What are the possible causes of these misconceptions of students in learning mathematics at primary level?
- How can these misconceptions be rectified / removed?
- How can teachers help the students to learn mathematics in a better way and remove the targeted misconceptions?

The study was conducted in 12 sample schools and concepts included in the investigation were not limited to grade IV rather, all contents of mathematics were included from grade I to IV, excluding grade V. The grade V was excluded for the reason that the pre-test was administered in the beginning of the grade V study.

The content tested through the pre-test was classified into eight concept areas namely, numbers, operations on numbers, fractions, operations on fractions, decimals, measurement, information handling and geometry. It was expected that the study would focus on misconceptions in few of these eight areas, but the findings of the pre-test and interviews with the teachers compelled the researcher to include all the eight areas as a significant number of misconceptions was found in all of the concept areas. The study was a mixed design approach (quantitative and qualitative). The pre-test and the post-test provided quantitative data while the interviews with the teachers and sample students helped to collect the qualitative data.

On the basis of identification of the misconceptions and errors through the pre-tests, four students from each of the 12 schools were interviewed along with their teachers. The analysis of the qualitative and quantitative data provided insight about the causes of them

is conceptions of students, and to remove these misconceptions a teachers training program was developed and conducted. At this stage, the study was converted into Pre-test-intervention-post-test design keeping only one school out of the 12 schools as control group and the remaining 11 as the experimental group.

Key misconceptions include numbers and operations on numbers; these were considered difficult by the students due to misconceptions regarding numbers' names (language problem) and their place value. Fractions were thought as two numbers instead of part of a whole. Decimals were considered mostly on the basis of digits without having proper understanding of the place value of the digits written in a decimal number. Understanding of units for measuring different quantities was not entrenched due to not using measuring tools practically by the students. Mostly estimation of length, mass and area were made full of mistakes. Scale for drawing a graph, both line and bar graphs was not understood; it was seemed that students were having the wrong conception as they were not trained to draw a graph. Geometry was full of misconceptions starting from measuring a line segment or drawing a line segment of given measurement. The use of simple geometrical tools like protractor, straight edge, compass or set squares was felt difficult by most of the students and their teachers.

The training of the teachers of the experimental group was focused on providing an opportunity to them to have an experience of doing mathematics as well as consolidating content including knowledge they were lacking. Misconceptions of the students in different concept areas were discussed with the teachers.

The difference in gain scores of the experimental group students provided evidence that the students' achievement improved in most of the concepts after being re taught by the experimental group teachers.

DEDICATION

This dissertation is dedicated to the primary school children of public sector schools of the Punjab who have been continuously ignored for more than sixty years, since the inception of Pakistan.

ACKNOWLEDGMENT

The researcher is thankful to Almighty Allah, The most Gracious, and The most Merciful. The Almighty Lord is All Knowing and human beings learn through the ability bestowed by Him. The researcher is grateful to the abilities provided by Allah which enabled him to make this humble contribution to the domain of students learning mathematics. After that the researcher owes the inspiration from Holy Prophet Hazrat Muhammad (S.A.W) who is beacon of light for whole humanity.

The researcher is highly indebted to his supervisor Dr. Usman Khalil Yousaf Zai for his constructive criticism, thought-provoking guidance and spiritual inspiration. Most importantly he made himself available to the researcher at each step from tool development to data analysis and report writing without which the completion of this work could not be possible. I learnt from Dr. Usman Khalil not only about research and attitude but also the way to cultivate students.

The researcher is extremely thankful to Dr. Abdul Ghafoor Chaudhary, for his technical and academic support which has been graciously provided by him.

The researcher is thankful to Professor Abd-us-Samad who inspired and encouraged the researcher to pursue his doctorate in mathematics education. If he were not there the researcher would not have taken this path which led him to University of Management and Technology Lahore.

Most importantly the researcher would like to thank Professor Dr. Zafar Iqbal (Chairman Dissertation Committee) and Professor Dr. Abdul Hameed (Dean School of Social Sciences and Humanities) for their support and guidance in completing this research.

The researcher is also indebted to Mr. Irfan Bashir and Mr. Shafiq Ahmad, PhD. Scholars, for their cooperation and help in data analysis and proof reading.

Finally the researcher would like to thank his wife and son Mohy-ul-Asar, who were his biggest supporters and fans on this difficult journey. They were always willing to support the researcher in his dreams and goals, listen to his frustrations and help him in composing himself to strive for completion of this work. The researcher wishes to pray for the long life and happiness of his daughters Kanwal, Sadaf and Attia for had been helped properly in their studies during these long years.

Rana Ghulam Mohyuddin

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INTRODUCTION

Background

The researcher has worked as a mathematics teacher, teacher educator and trainer of mathematics teachers and head teacher of different government high schools. The experience and continuous interaction with students and teachers of mathematics, specifically at school level have resulted in his concern with the learning of mathematics. It has become increasingly important to know how students can be taught more effectively in the classroom. With this background, work experience and professional assignments, the researcher wished to identify the kinds of errors and misconceptions students make at Primary level and investigate the possible causes for errors and misconceptions to suggest remedial measures for the problems faced by the students.