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To Study The Performance On The Three Tiers Of Three Tier Concept Achievement Test In Mathematics

Dr. Tirath Singh

Principal Sacred Heart International College of Education, Barnala, Punjab, India.

Gagandeep Tiwana,

Research Scholor, Punjabi University, Pataila, Punjab, India.

ABSTRACT

The purpose of the study was to find the complete understanding of concepts, true conception, false negatives, lack of knowledge, errors and Misconceptions among secondary school students. Three Tier Concept Achievement Test (TTCAT) in Mathematics was administered on 800 (Government 431and Private 369) secondary school students of grade IX. Mean and standard deviation was found under descriptive statistics. To study the complete understanding of concepts, true conception, false negatives, lack of knowledge, errors and Misconceptions among secondary school students in relation to type of school t-ratios were computed.

Among the two groups significant differences were found in Mathematics complete understanding of concepts, lack of knowledge and Errors on Three Tier Concept Achievement Test. On the other hand no significant difference was found in true conception, false negatives and misconceptions among secondary school students.

Key Words: Three Tier Concept Achievement Test, complete understanding of concepts, true conception, false negatives, lack of knowledge, Errors and Misconceptions.

INTRODUCTION

Over the last few years issues connected with learning and teaching mathematics have become a matter of the highest importance for everyone involved in education, training and publishing. It has been taken up at the highest policy level. Mathematical competence has been identified by the European Parliament and the Council of the European Union as one of the key competences necessary for personal fulfillment, active citizenship, social inclusion and employability in modern society.

It is a sound truth that regardless of the greatest efforts made by teachers, students do not grab primary thoughts enclosed in the class. Even some of the students give the right responses but are only using appropriately memorizing words. Errors may occur for a variety of underlying reasons, ranging from the careless mistake. "Between the thought and the word spoken, between the word spoken and the word heard, between the word heard and the meaning taken, lies a vast gulf."(Dunlop, 1997).

Eryilmaz and Surmeli (2002), Pesman (2005) and Kutuluay (2005) revealed that errors among secondary school students are due to mistakes, false negatives, lack of knowledge and misconceptions. While identifying errors and misconceptions among students they referred mistakes as the incorrect answers. All the errors are not misconceptions. Misconceptions refer to intuitive ideas that students have constructed for themselves as a result of experience with their physical environment, popularly known as students' conceptions, children's science alternative conceptions or alternative frameworks (Gilbert and Watts, 1983) and as knowledge (Reiner, Slotta, Chi and Resnick, 2000) and as commonsense beliefs (Hestenes, Well and Swackmer, 1992). All the errors are not misconceptions, since misconceptions happen when a person shows confidence in the objectively false concept (Wikipedia, The Free Encyclopedia, 2008).

Some studies revealed that students' common errors grounded in the difficulty of understanding the algebra (Almog & Ilany, 2012 and Cangelosi et al.2013),errors in abstract algebra (Wheeler and Champion, 2013 and Georgios,2014), errors in solving inequalities and misconceptions and misconceptions regarding solutions of inequalities (Nava and Bat-Sheva,2012; Vicki-Lynn et.al, 2013 and Bicer; Capraro and Capraro, 2014) the errors are due to interference from new learning, difficulty in operating with the negative integers, misconceptions of algebraic expressions and misapplication of rules (Lim, 2010; Rakes, 2010; Ji Won 2013; Cangelosi et al., 2013;Kristie, Willard and Teufel, 2014

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and Gozde, 2015).

OBJECTIVES OF THE STUDY

To study the performance of students on all the three tiers of Three Tier Concept Achievement Test in Mathematics.

HYPOTHESIS OF THE STUDY

There is no significant difference between the complete understanding of concepts, true conception, false negatives, lack of knowledge, errors and misconceptions Government and Private secondary school students.

Method and Sample: Students studying at the secondary school stage in Punjab comprised the universe of the study. All the students of IX class who were studying in schools affiliated to C.B.S.E are the target population of the study. Sample of 800 students were collected by multistage sampling.

TOOL USED

Three Tier Concept Achievement Test (TTCAT) in Mathematics.

DATA COLLECTION

Data was collected from the schools situated in different districts of Punjab. The researcher personally visited the school. A sample of 800 (Government 431and Private 369) secondary school students of grade IX was collected.

ANALYSIS AND STATISTICAL TREATMENT OF DATA

Descriptive Statistics and t-test was employed to analyze the data. The complete understanding of the student is assumed if all the three tiers were correctly answered whereas, if first two tiers were answered correctly, second and third tier were answered correctly, all the tiers answered incorrectly, only third tier answered correctly, and first tier wrong are termed as True Conception, False Negatives, Lack of Knowledge, Misconceptions and Errors. The mean, standard deviation, and t-value of, Complete Understanding of Concept, False Positives, True Conception, False Negatives, Lack of Knowledge, Misconceptions and Errors of grade IX School students on Three Tier Concept Achievement Test (TTCAT) in Mathematics with respect to type of school i.e. government and private provided in the table 1.

Table 1

Complete Understanding of Concept, True Conception, False Negatives, Lack of Knowledge, Misconceptions and Errors of grade IX School students on Three Tier Concept Achievement Test (TTCAT) in Mathematics with respect to type of school

Dimension	Type of school	N	Mean	SD	T
Complete Understanding of Concept	Government	431	17.49	6.73	3.63*
	Private	369	19.23	6.78	
True Conception	Government	431	0.52	1.06	1.13
	Private	369	0.44	0.94	
False Negatives	Government	431	2.68	2.22	0.58
	Private	369	2.41	2.02	
Lack of Knowledge	Government	431	4.61	2.92	3.15*
	Private	369	3.98	2.66	
Misconception	Government	431	5.10	2.91	0.27
	Private	369	5.04	3.30	
Error	Government	431	13.64	5.00	3.58*
	Private	369	12.35	5.09	

*P<0.01

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Following are the findings on the basis of table 1

1. There is a significant difference in the Complete Understanding of Concepts of secondary school students. Students of private schools had more understanding of concepts than students of government schools.
2. There is a no significant difference in the True Conception of secondary school students. Students of private and government schools had almost equal True Conception of concepts.
3. There is a no significant difference in the False Negatives of secondary school students. Students of private and government schools had almost equal False Negatives of concepts.
4. There is a significant difference in the Lack of Knowledge of secondary school students. Students of government had more Understanding of Concepts than students of private schools.
5. There is a no significant difference in the Misconceptions of secondary school students. Students of private and government schools had almost equal Misconceptions.
6. There is a significant difference in the Errors of secondary school students. Students of private and government schools had almost equal Errors.

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