International Journal of Education and Psychological Research (IJEPR) Volume 9, Issue 4, December 2020
Print - ISSN: 2349 - 0853, e-ISSN: 2279 - 0179 Available online at www.ijepr.org
Orignal Research Article Open Access

Effectiveness of Multiple Intelligence Based Teaching of Science with Special Reference to Cognitive and Non-Cognitive Variables of VI Class Students

Dr. Suman Verma [1]

Abstract:

The present experimental study was conducted on a sample of 160 students of class VI of science subject with special reference to cognitive variable (achievement) and non-cognitive variable (attitude) with the help of multiple intelligence based teaching (MIBT). The achievement was measured by the achievement test as developed by the investigator. Data was analyzed by using mean, standard deviation and t test. The attitude was measured by General Science Attitude Scale (GSAS) constructed and standardized by Dr. Mrs. Avinash Grewal, Bhopal. The result show that there is a significant difference in the achievement levels and attitude towards science subject of the students of experimental group and control group. Boys and girls of experimental group and control group differ significantly in their achievement levels and attitude. MIBT proves comparatively effective method of teaching in terms of student's attitude towards science subject and performance.

Article History: *Submitted: 05th October, 2020, Revised: 20th November, 2020, Accepted: 25th November, 2020, Published: 31st December, 2020.*

I. INTRODUCTION

Network develops vigorously and a variety of technology involved attain to maturity, creating a more suitable learning environment with such infrastructure is becoming more practical. Development of a tele-education environment has become key to development of domestic and overseas University.

One of the most compelling, yet controversial, new approaches to education is the multiple intelligence theory proposed by Howard Gardner (1983), Gardner indentified eight faculties that he labeled as "Intelligences". He defined intelligence as "the capacity to do something useful in the society in which we live, Intelligence is the ability to respond successfully to new situations and the capacity to learn from one's past experiences. Simply but, Gardner proposes that people employ several different intelligences, rather than one intelligence."

The intelligences, briefly described are :-

Linguistic :- The intelligence of words.

Logical mathematical :- The intelligence of numbers and reasoning.

Spatial :- The intelligence of pictures and images.

Musical :- The intelligence of tone, rhythm and timbre.

Bodily Kinesthetic:-The intelligence of the whole body and the hands.

Interpersonal :- The intelligence of social interactions.

Intrapersonal :- The intelligence of self knowledge.

Naturalistic :- The intelligence of nature or real life situations.

Each of this intelligence is a distinct module in the brain and operates more or less independently of the others. It is very important that a teacher take individual differences among learners very seriously. The bottom line is a deep interest in children and how their minds are different from one another and in helping them to use their minds well.

Attitude towards teaching methods, teaching strategies are very essential for individual differences in classroom.

Attitude is very complex phenomenon and difficult to explain, but attitude is significant determinets for individual differences.

On the basis of attitudes or against inter individual differences can be measured. The inter individual difference can also observed strongly favourable and favourable. The degree of favourableness indicates the inter individual variations in attitudes. A teacher can make use of this variations among students to deal their problems and organizing appropriate educational programmes in school and class room teaching.

The main focus of educative process is to improve the performance or learning of the students. Performance assessment is the process of measuring the terminal behaviours of the students at the end of instruction. The achievement is the end product of the instruction usually verbal performance.

There are three types of objectives which are emphasized in teaching-learning situations-cognitive, affective and psychomotor but it is the assumption of educationists and psychologists that cognitive achievement is the best representation of the total behavioural changes of students.

In the present study achievement test have a real purpose in measuring the effectiveness of multiple intelligence based teaching and what are the attitudes of the students towards the science subject.

[1]Asst. professor, Maulana Azad College of Education, Bilaspur, (C.G.) Email:sumanverma110173@gmail.com

REVIEW OF THE RELATED LITERATURE

II. STUDIES ABROAD

(1) Gardner and Hatch (1989) discussed about he educational implications of the theory of multiple intelligence.

In this Gardner opposed the practices of traditional education system that typically place a strong emphasis on the development and use of verbal and mathematical intelligence.

(2) Blythe and Gardner (1990) proposed the process of implementation of multiple intelligence theory based instructional strategies for the schools. They stressed the urgency and importance of adopting this method in schools.

(3) Munro (1994) conducted a study on a model of individual ways of learning and its implications for mathematics teaching.

(4) Constonzo and Paxton (1999) pointed out that multiple intelligence theory could be used in the classroom as a guide to provide a great variety of way for students to learn and to demonstrate their learning.

(5) Kuzniewski (2002) conducted on action research project described a program for expanding multiple intelligence to increase reading comprehension in both english and mathematics.

III. RESEARCHES ON NATIONAL LEVELS

(1) Ebel (1938) stated that a scientific attitude is cause which will tend to foster scientific achievement.

(2) Bhaskara Rao (1989) identified a high positive association between scientific attitude and biology achievement in secondary school pupils.

(3) Desai (1979) and Hirunval (1980) observed a positive relationship between class-room climate and pupils academic achievement in their studies conducted in Gujrat.

(4) Pal (1982) identified that good schooling, interest and industriousness played on important role in the learning of science.

(5) Subramanyam (1982) it was revealed that among the school factors, accommodation, educational level and experience of teachers, availability of instructional material, books and reading room facilities influenced the reading attainment of children positively.

(6) P. Xavier and P. Annaraja (2007) identified that Multiple Intelligence Based Teaching (MIBT) is an effective method in teaching and learning mathematics among primary school students. This method inspired the exploration of multiple intelligence, nurtured and used various strategies, properties and relationship in learning mathematics. So the multiple intelligence based teaching is very useful in teaching and learning mathematics to the primary school students.

IV. OBJECTIVES OF THE STUDY

(1) To study the comparative effectiveness of MIBT and traditional methods of teaching science.

(2) To study the significant difference in the achievement of the students of experimental & control groups.

(3) To study the significant difference in the attitude of the students of experimental and control groups.

(4) To study the gender impact on the achievement of the students under study.

(5) To study the gender impact on the attitudes of the students towards science subject.

V. NULL HYPOTHESES

HO_1 : There shall be no significant difference between the achievement of the student of experimental and control groups.

HO_2 : There shall be no significant difference between the attitude of the student of experimental & control groups.

HO_3 : There shall be no significant difference between the achievement of the boys and girls of experimental and control groups.

HO_4 : There shall be no significant difference between the attitude of the boys and girls of experimental and control groups.

VI. CONSTRUCTION AND USE OF TOOLS

(a) Multiple Intelligence Based Teaching (MIBT Chart) (Prepared by the Investigator)

(b) General Science Attitude Scale (GSAS) - Constructed and standardized by Dr. Mrs. Avinash Grewal Bhopal

(c) Achievement Test - Achievement test of science for class VI prepared by the investigator.

VII. DATA ANALYSIS

By administering the tools the data were collected and corresponding mean, SD and t value were computed :

Table – 1

t - test results for Achievement Score of

Experimental & Control Group

S. No	Group	Number	Mean	Standard Deviation	Standard Error	t-value	Significance 0.05 level
1	Experimental Group	80	23.37	9.62	1.36	4.13	Significant
2	Control Group	80	17.75	10.46			

Interpretation of the Result :

For 158 df the obtained value of t = 4.13 is greater than the tabulated value 1.98 at 0.05 level of significance, so it is concluded that there is significant difference between the mean achievement score of experimental & control Group. Hence Ho1 is rejected. Hence there is evidence to reject the null hypothesis. It is concluded that students taught by MIBT (E-group) have higher achievement score in comparison to students taught by traditional method (C-group).

Discussion :

This result of present study is also corroborated with the findings of P. Xavier and P. Annaraja (2007). They have also reported that MIBT more effective in comparison to the traditional method of teaching mathematics. In the present study the MIBT is more effective than traditional method of teaching science as well.

Table - 2

t - test results for Attitude Score of Experimental & Control Group

S. No	Group	Number	Mean	Standard Deviation	Standard Error	t-value	Significance 0.05 level
1	Experimental Group	80	56.25	20.11	3.10	3.95	Significant
2	Control Group	80	44.00	19.10			

Interpretation of The Result :

For 158 d.f. the obtained value of t = 3.95 is greater than the tabulated value 1.98 at 0.05 level of significance, so it is concluded that there is significant difference between the mean attitude scores of the students of experimental and control group. Hence null hypotheses Ho2 is rejected. It is clearly indicated that the student taught by MIBT have shown higher & more positive attitude towards science subject in comparison to the students taught by traditional method.

Discussion :

Looking back in the second chapter (Review of Related Literature) the studies of Ebel (1938) & Bhaskara Rao (1989) have clearly indicated the positive attitude of students towards science subject.

Result of the present study is corroborated by the results of both studies mentioned above. In the present times there is a positive attitude towards science subject because most of the students have scientific attitude due to modern technology and awareness about the benefit and utility of science subject.

Table – 3

t - test results for Achievement Score of Boys & Girls of Experimental & Control Group

S. No	Group	Students	Number	Mean	Standard Deviation	Standard Error	t-value	Significance 0.05 Level
1	Experimental Group	Girls	40	22.62	9.57	2.22	2.02	Significant
		Boys	40	18.12	10.33			
2	Control Group	Girls	40	22.5	9.86	2.20	3.01	
		Boys	40	15.87	9.89			

Interpretation of The Result :

In this way we find that the obtained value of 't' is 2.02 and 3.01 for 78 df is greater than the tabulate value 1.99 at 0.05 level of significance. So null hypothesis No. 3 is rejected. Its indicated that mean achievement scores of Experimental & Control Group differ significantly that is both boys & girls of experimental group & control group are differ significantly in there achievements. That is gender impact was found in the achievement of boys & girls.

Discussion :

In order to judge the impact of gender difference on achievement scores on achievement test secured by boys and girls of experimental group and control group were compared for testing of hypothesis. Significant difference was found in their achievements.

Girls of experimental and control groups secure higher achievement scores than that of boys of experimental and control groups.

Hence, gender difference influence the achievement of experimental group and control group students.

Table – 4

t - test results for Attitude Score of Boys & Girls of Experimental & Control Group

S. No	Group	Students	Number	Mean	Standard Deviation	Standard Error	t - value	Significance 0.05 Level
1	Experimental Group	Girls	40	54.25	19.9	4.47	4.02	Significant
		Boys	40	36.25	20.11			
2	Control Group	Girls	40	53.25	18.90	4.24	2.18	
		Boys	40	44	19.10			

Interpretation of The Result :

In this way we find that the obtained value of 't' is 4.02 and 2.18 for 78 df greater than the tabulate value 1.99 at 0.05 level of significance. So null hypothesis no. 4 is rejected. Its indicated that mean attitude scores of Experimental & Control Group differ significantly that is both boys & girls of experimental group & control group differ significantly in their attitude. That is gender impact was found in the attitude of boys & girls.

Discussion :

In order to judge the impact of gender difference on attitude scores on attitude scale secured by boys and girls of experimental group and control group were compared for testing of hypothesis. Significant difference was found in their attitude.

Girls of experimental and control groups secure higher attitude scores than that of boys of experimental and control groups.

Hence, gender difference influence the attitude of experimental group and control group students.

VIII. MAJOR FINDINGS

(1) In the study it is found that multiple Intelligence based teaching of science differ significantly in their effectiveness as compared to the traditional method of teaching science.

(2) Students of experimental group and control group differ significantly in their achievement levels. They show different achievement levels and MIBT prove comparatively effective method of teaching in terms of students performance.

(3) Students of experimental group differ significantly in their attitude towards science subject in comparison to the attitude of students of control groups. Experimental group show higher attitude towards science subject in comparison to control group. In this way teaching science through MIBT method has proved in developing positive attitudes towards science in comparison to the traditional method of teaching science.

(4) Boys and girls of experimental group and control group differ significantly in their achievement levels. In this way gender impact on the achievement of boys and girls of both types of groups has been ascertained in this study and positive impact goes in favour of girls achievement.

(5) Boys and girls of experimental group and control group differ significantly in their attitude also. In this way gender impact on the attitude of boys and girls of both types of groups has been ascertained in this study. They show difference in their attitude towards science subject.

IX. CONCLUSIONS

From the above discussion and findings we can conclude that the multiple Intelligence Based Teaching (MIBT) of science is comparatively more effective than the traditional method of teaching science. Multiple intelligence based teaching helps the students to improve their achievement and attitude both in learning science. Moreover, this method provides opportunity in developing students multiple capabilities of learning science.

In the present study there is also gender impact on the achievement and attitude of the students in learning science.

So, the multiple intelligence based teaching is very useful in teaching and learning science to the students of upper primary school students.

X. REFERENCE

(1) Armstrong. T. (1987). *In their own way : Discovering and Encouraging your Child's personal Learning Style*, New York.

(2) Armstrong. T. (1993). *7 Kinds of Smart Identifying and Developing Your Many Intelligences*. New York Plume.

(3) Armstrong. T. (1994). *Multiple intelligence in the Classroom Second Edition, Association for Supervision and Curriculum Development*, Alexandria.

(4) Blythe. T & Gardner, H. (1990). *A school for all intelligences, Educational leadership*, 47(3), 33-37.

(5) Bhaskara Rao. D. (1989). *A comparative study of scientific Attitude, scientific aptitude and achievement in Biology at secondary school level.* Ph.D. Thesis. Osmania University.

(6) Bhatnagar, A.B. and Bhatnagar, S.S. (2005). *Teaching of Science fourth Edition,* Meerut, Surya Publication.

(7) Bhaskara Rao D. and Pushpa Latha (2003) D. *Achievement in Science.* New Delhi Discovery Publishing House.

(8) Costanzo, M., & Paxton D. (1999). *Multiple assessments for multiple intelligence.* "Focus on Basics, 3" (A), 24-27.

(9) Campbell L.B. Campbell and Dickisnon (1992). *Teaching And Learning Through Multiple Intelligences*, Tucson, Ariz, Zephyr Press.

(10) Desai, D.B. and Ameeta Govind (1979). *Studies in Achievement motivation. Baroda* : Centre for Advanced study in Education M.S. University of Baroda.

(11) Gardner. H., & Hatch, T. (1989). *Multiple Intelligences go to school : Educational Implications of the theory multiple intelligences*. Educational Researcher, 18(8), 4-9.

(12) Gardner. H. (1987). *Frames of Mind*., New York Basic Books.

(13) Garrette Henry E. : (1967) *Statistics in Psychology and education; Vakils,* Feffer and simons private Ltd. Bombay.

(14) GRADY, ANN MC GLINCHY : (1968) *"The effect of teaching selected topics of the Middle school Mathematics Curriculum using the microcomputer"* (Ph.D Dissertation, School of Education Boston University) page-50.

(15) Kunro, J. (1994). *Multiple intelligence and Mathematics Teaching,* January (ERIC Document No. Ed 372927).

(16) Kuzniewski. F. (2002). *Using Multiple Intelligence to Increase reading comprehension in English and Math*, ERIC Document No. Ed 420839.

(17) Khan J.V. & Best J.W. *Research in Education, 7th Ed. Prentice* – Hall of India Private Limited.

(18) Kothari C.R. (1991). *Research Methodology Revised second edition,* New Age International (P) Limited, Publishers.

(19) Lazear D. (1991). *Seven Ways of Knowing : Teaching for multiple Intelligence,* Palatine, III : Sky light Publications.

(20) Pal, G. (1982). *An Enquiry into the Factors involved in the learning of science by Adolescent pupils.*

(21) P. Xavier & P. Annaraja (2007). *Effectiveness of multiple intelligence based teaching (MIBT) in teaching mathematics for primary school students*. i-manager's Journal on School Educational Technology, Vol.-3, September-November, 38-42.

(22) Sali V.Z. (1982). *Principles and Teachniques of Unit Testing. First Edition.*, National Publishing House 23, Darya Ganj, New Delhi.

(23) Sharma R.A. (2006). *Fundamentals of Educational psychology Revised Edition,* Surya Publication Meerut.