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EFFECT OF CONCEPT ATTAINMENT MODEL ON MATHEMATICAL ACHIEVEMENT OF 11 TO 14 YEAR OLD STUDENTS

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Abstract
The main objective of the present study was to see the effect of concept attainment model on 11 to 14 year old students in Mathematical Achievement as a function of treatment and gender and their interaction. For the purpose the investigator selected 508 male and female of 11 to 14 year old students randomly .All students of the sample were divided in to experimental group and control group. First the investigator administrate pre-test of mathematics which is based on their previous knowledge on students of both the groups after that investigator applied 30days treatment to both the group i.e. experimental group was taught by Concept Attainment Model and Control group was taught by Traditional Method. After treatment the post-test administered by the investigator on both the group and gain scores were obtained. Data were analyzed by two way analysis of variance. The result revealed that there was a significant difference found in mathematical achievement for groups at 0.01 level of significance.

Introduction

If we insist that Mathematics be part of the core curriculum for all students then we must also make it a fundamental right that all students enjoy learning Mathematics.

Maths Science today is becoming increasingly complex and abstract. It is therefore important that new methods and techniques of teaching must be introduced in order to make the teaching of Mathsscience more effective and efficient. These are the days of knowledge explosion. Hence the learners must be prepared to process information suitably and meaningfully so that the information can be retained for a longer time and can be used in different situations of life. In order to accomplish this objective, the root and fruit of knowledge, that is, the pupils must attain concept.

The Concept Attainment Model of Teaching was developed by J.S. Bruner, J. Goodrow and George Austine in 1956. Usually it is named as Bruner‟s Concept Attainment Model. The model emerged out of the study of thinking process in human beings. It is based on the assertion that a human being is endowed with the capacity to discriminate and to categorize things in groups. This model is used for teaching concepts to the students. It enables them to understand fully the similarities and relationship among various things of the environment. Concept Attainment Model is built around the study of thinking conducted by Bruner. The Bruner‟s Concept Attainment Model states that the role of teacher is to create situations in which students can learn on their own rather than to provide packaged information to students. It provides an efficient method for presenting organized information from a wide range of topics to students at every stage of development. The learning of concepts is of utmost importance for elementary school students as they learn and communicate with the help of 'concepts'. The acquisition of knowledge is possible only through concept learning because knowledge is a chain of concepts.

Objective of the study

To study gender wise effect of concept attainment model and their interaction on Mathematical Achievement of 11 to 14 year old students.

Hypothesis of the Study

There is no significance gender wise individual and joint effect of concept attainment model on Mathematical Achievement of 11 to 14 year old students.

Methodology: Experimental Research Method and Non Equivalent Control group design was used for present research work.

Sampling: In the present research work the investigator randomly selected 4 schools of Panna City through lottery system and all the students of these schools were assigned i.e.508 for both the group.

Tools: Independent Variable Measures (CAM) . Independent Variable Self made lesson plan according to Concept Attainment Model and Traditional Method.

1. Dependent Variable Measures , Self made Achievement Test in Mathematics.

Procedure.
All students of the sample 508 male and female were divided into experimental group and control group. First the investigator administered a self made Pre Test on both the groups which is based on previous knowledge of Mathematics concepts of students of 11 to 14 year old (class 6^{th} to 8^{th}) ,then investigator applied 30 days treatment to both the groups. Experimental group taught by (CAM) and control group taught by traditional method after treatment the investigator administered Post Test on both the groups.(Experimental group& Control Group).

Scoring
Pre Test Scoring – In objective type question investigator has given 2 marks for each correct answer.
Post Test Scoring – In objective type question investigator has given 2 marks for each correct answer.
Gain Score - After resulting both the test Gain Score was obtained as: Post Test Score – Pre TestScore = Gain Score

Statistical Analysis – For testing the hypothesis, data was analysed by using Mean, Standard Deviation, Anova.
Analysis & Discussion

Table No.1,Summary of 2*2 Factorial design ANOVA of mathematics achieve score

Source	type III sum of square	Df	Mean Square	F
Gender	14.277	1	14.277	4.822
Method	1441.577	1	1441.577	486.881**
Gender*Method	4.132	1	4.132	1.395
Error	1492.262	504	2.961	
Total	13510.000	508		

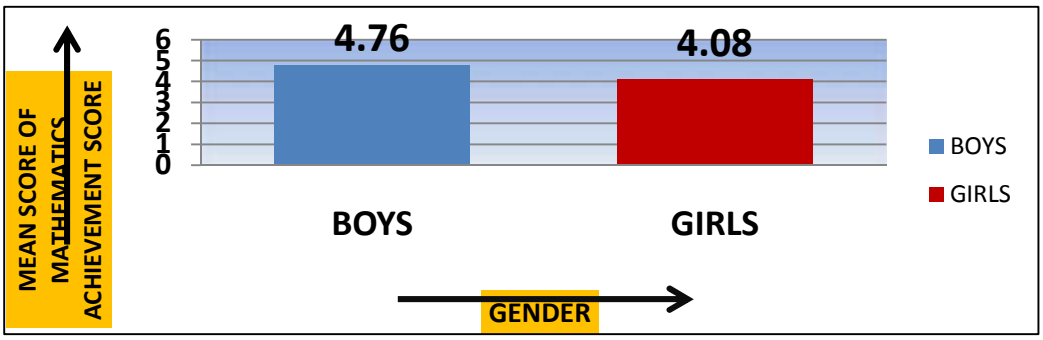
** = Significant at 0.01 significance level

Table No. 2,Method and Gender wise N, $\bar{x}$ and σ of mathematics achieve score

Method	Gender	N	mean	Std.Deviation
concept attainment model	girls	83	5.9277	1.63635
	boys	174	6.4655	2.21828
	Total	257	6.2918	2.06071
Traditional Method	girls	103	2.6019	1.14908
	boys	148	2.7635	1.39660
	Total	251	2.6972	1.30075
Total	girls	186	4.0860	2.15936
	boys	322	4.7640	2.63812
	Total	508	4.5157	2.49294

From table no.1 it is clear that the F-value for gender value is 4.822. Which is not significant at 0.01 level of significance with df =1/507. It means that mean score of academic achievement in mathematics of 11 to 14 years old boys and girls did not differ significance. So there was not a significant effect of gender on mathematic achievement score was found. Thus the **Null Hypothesis** "There is no significance gender wise difference for academic achievement in mathematics of 11 to 14 year old students" **is not rejected.** (graph no.1)

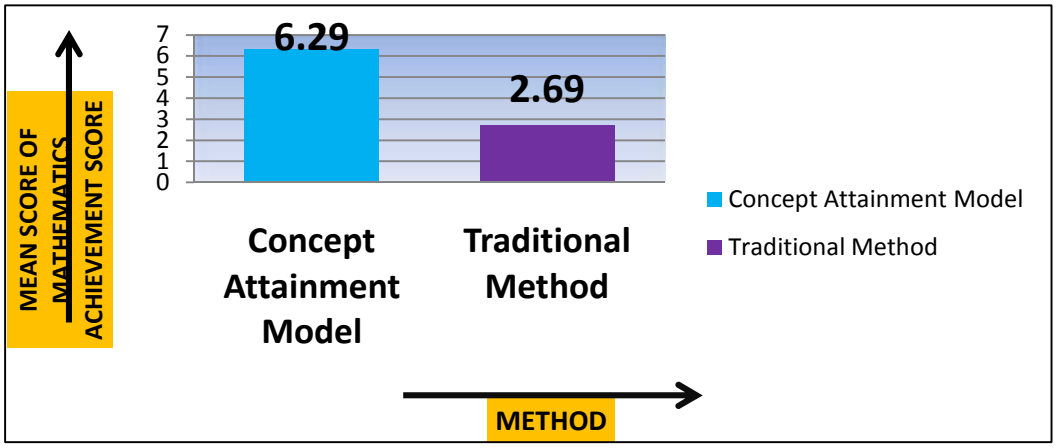
Graph 1, Gender Wise Mean Score of Mathematics Achievement Score



From the table no.1 it is evident that F- value for the method is 486.881 which is significant at 0.01 level of significance with df=1/507 it means that mean score of academic achievement in mathematics of both methods (concept attainment model and traditional method)of 11 to 14 year old students differs significantly. So there was a significant effect of concept attainment model on academic achievement in mathematics of 11 to 14 year old students. Thus the **Null Hypothesis** "There is no significance effects of concept attainment model on academic achievement in mathematics of 11 to 14 year students." **is rejected.** Further the mean score of mathematical achievement of those 11 to14 year old students who were taught by concept attainment model (Experimental group) was 6.2918. Which was significantly higher than those 11 to 14 year old students who were taught by traditional method (control group) whose mean score of academic achievement in mathematics was 2.6972 (vide table no.2,Graph no 2).

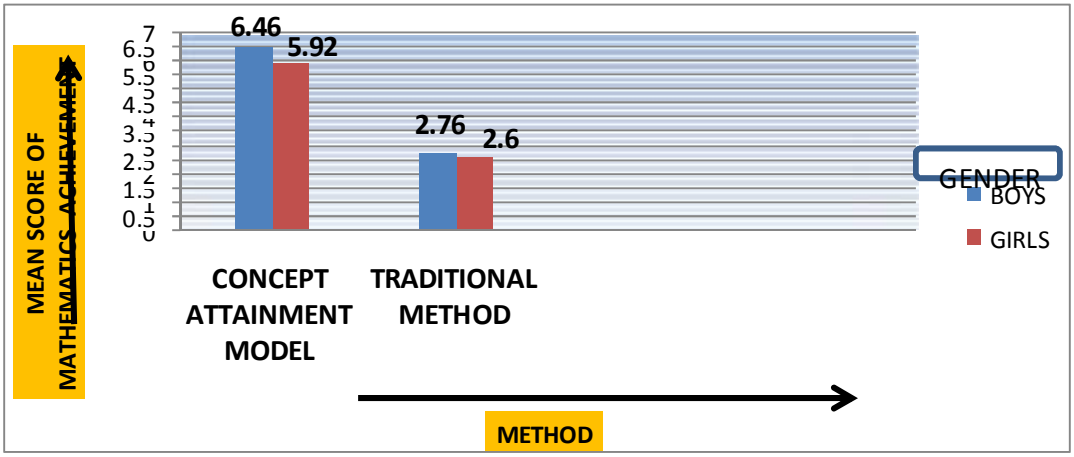
It may therefore be said that experimental group students are found to have significantly better mathematics achievement score than control group students.

Graph 4.26, Method Wise Mean Score of Mathematics Achievement Score



From table no 1, the F- value for interaction between gender and method was 1.395. which was not significant at 0.01 level of significance. with df=1/507 (vide table no.1) It means that mean score of academic achievement in mathematics of 11 to 14 years old boys and girls students who were belonging to concept attainment model (Experimental group) and traditional method (control group) did not differ significantly. Thus the Null Hypothesis " There is no significance gender wise individual and joint effects concept attainment model on of 11 to 14 years old students" **is not rejected.** (graph no.3)

Graph No. 3,Interactional Effect of Gender and Concept Attainment Model For Mathematics Achievement Score



Interpretation and Discussion

Number of researches has been done in concept attainment model like ,**Mary B. Harris, Robert C. Evans (1973)** found that significance difference between females had significantly higher score than males. This findings do not support the present research work. (Vide Graph no.1). Similarly findings like that of **Lekha (2000), Prabhakaran & Rao (1998), Prapvade (1980)** found that the Concept Attainment Model was more effective than that of Traditional Method in acquisition of Mathematical Concepts. These finding supported the present research work. (Vide Graph no.2) .

The Investigator realized that during the treatment those students who were taught by concept Attainment Model were learning better mathematical concept than that of students who were taught by Traditional Method. But both groups have almost equally benefited. [Vide Graph No.3]

Conclusion

There was a significant effect of concept attainment model on mathematical achievement of 11 to 14 year old student.

References

1. Anderson, C. W., & Smith, E. L. (1983). Children's conceptions of light and colour: Developing the concept of unseen rays. Paper presented at annual meeting of American Educational Research Association, Montreal, Canada. In Richard I Arends. Learning to teach (3rd ed.). New York: Mc Graw Hill Inc
2. Anderson, L. W., & Krathwohl, D. R. (Eds.). (2000). A taxonomy for learning, teaching, and assessing: A revision ofBloom'staxonomyofeducationalobjectives.NewYork:Longman.
3. Anderson, R. E., De Vito, A., Dyrli, O. E., Kellog, M., Kochendorfer, L., & Weigand, J. (1970). Developing children's thinking through science. New Jersey: Prentice Hall.
4. Anuradha, Joshi., & Anand, Patra. (1993). Impact of concept attainment model on general mental ability. SCERT. Research Bulletin. March-June. Maharashtra.
5. Ayishabi, T. C. (1996). Teaching zoology through concept attainment model at plustwo level: An experimental study. Journal of Indian Education, 65-70.
6. Aziz, Talat. (1990). A study of the comparative effectiveness of the information processing models of teaching in developing certain concepts in chemistry at the secondary stage. In N. Vaidya, Science education (pp. 354 -369). Fifth Survey of Educational Research 1988-92 Trend reports Volume 1. New
7. Bailey, Beeke. (1987). Developmental theories and instructional strategies. ED 319482. In B. C Mahapatra.Models of teaching in education .New Delhi:Sarup & Sons.
8. Bairagya, S. S., Ghosh, S. K., & Meta, J. (2005). A study on relative effectiveness between Concept Attainment Model and traditional method of teaching in Economics. Journal of Educational Research and Extension, 42(1), 9-15 Barry, Jennifer. (2005). The effect of socio-economic status on academic achievement. (Unpublished master's thesis,
9. Bawa, M. S. (1991). Conceptual learning and research possibilities: Bruner's view. Indian Educational Review, 26(2), 46-60.
10. Borich, G. (1996). Effective teaching methods (3rd ed.). Englewood Cliffs, New Jersey: Merril/ Prentice-Hall, Inc. Borkmen. (1989). In B. C Mahapatra. (2004). Models of teaching in education. New Delhi: Sarup & Sons. p.93.
11. Boulware, B. J., & Crow, M. L. (2008). Using the concept attainment strategy to enhance reading comprehension. The Reading Teacher, 61(6), 491-495.
12. Bruner, Jerome S., Goodnow, Jacqueline J., & Austin, George A. (1956). A study of thinking. New York: John Wiley & Sons Inc.
13. Clement, J. (1983). In Joel J Mintzes., Joseph D Novak., & Wandarsee. (Eds.),Teaching science for understanding: A human constructivist view.California: Academic Press.
14. Cohen, Barbara L. (1988). In B. C Mahapatra. (2004). Models of teaching in education. New Delhi: Sarup & Sons.
15. Cook, Willie Clance. (1981). The effect of negative and positive instances in teaching mathematics concepts to freshman at Florida University. Dissertation Abstracts International: Section A. Humanities and Social Science, 41(11).
16. D'lima., & Suvarna. (1990). A comparative study of the effectiveness of the reception oriented and the selection oriented concept attainment model in teaching of concepts in mathematics (Unpublished doctoral dissertation). Mumbai University, Mumbai.
17. Dagher, Z R. (1995). Review of studies on the effectiveness of instructional analogies in science education. Science Education, 79(3), 295-312.

18. Dahiya, S. S. (1995). Effect of mastery learning strategy on pupils' achievement in mathematics and their creative abilities (Unpublished doctoral dissertation).M. D University, Rohtak.
19. Dalton, M., & Dodd, J. (1986). In B. C Mahapatra. (2004). Models of teaching in education. New Delhi: Sarup & Sons.
De, Kamal Krishna. (1999). A study on the impact on the concept on the achievement of students in physical science. The Science Teacher, 4(34), 8-12.
20. Deethardt, John F. (1986). Models for teaching speech communication. Written materials for a workshop presented at the annual meeting of the speech communication association. In B. C Mahapatra. (2004). Models of teaching in education. New Delhi: Sarup & Sons.
21. Dell'Olio, J. M., Donk, Tony. (2007). Models of teaching: connecting student learning with standards. New Delhi: Sage Publications, Inc.
22. Eckstein, S. G., & Shemesh, M. (1993). Stage theory of the development of alternative conceptions. Journal of Research in Science Teaching, 30(1), 45-64 Einstein, Albert. Retrieved from www.quotegarden.com/science.html Fischbach, Fritz A., & Sell, Nancy J. (1986). A structural approach to teaching applied problem-solving through technology assessment. Journal of Chemical Education. 63(6), 522-525.
23. Gagne, Robrt M. (1977). The conditions of learning (3rd ed.). New York: Holt,Rinehart and Winston.
24. Garret, Henry E. (2006). Statistics in psychology and education. New Delhi: Cosmo Publications. Garret, Henry E., & Woodworth, R. S. (1981). Statistics in psychology and education. Bombay: Vakils, Feffer and Simons Ltd.
25. Gilmore, Allison Cobb. (1985). The effect of teacher questions and student questions on fifth and sixth grade students' acquisition of a social studies concept. Dissertation Abstracts International: Section A. Humanities and Social Science, 46(11), 3246.
26. Gough, De borah. (1991). Thinking about thinking. Research Round up. 7(2). (ED327980). Retrieved from http://www.eric.ed.gov/
27. Greenwald, Nine. (1982). Beyond purely divergent thinking; Another facet of creativity. Dissertation Abstracts International: Section A. Humanities and Social Science, 42(1), 4703.
28. Jackman, Diane H., & Swan, Michael K. (1994). Alternative Instructional models for interactive video network delivery. (ED373259). Retrieved fromhttp://www.eric.ed.gov/
29. Jaimini, Nirupama. (1991). Effect of teaching strategies on conceptual learning efficiency and retention in relation to divergent thinking . (Unpublished doctoral dissertation). In L. C Singh & Nirupama Jaimini, Teaching strategies (pp. 437 – 448). Fifth Survey of Educational Research 1988-92 Trend reports Volume 1. New Delhi: NCERT.
30. Jang, Shy-Jong. (1995). The effects of concept attainment model on non-physics college students' concept formation. Dissertation Abstracts International:Section A. Humanities and Social Science, 56(6), 2187-A.
31. Jang, Syh-Jong. (2010). The impact on incorporating collaborative concept mappingwith coteaching techniques in elementary science classes. School Scienceand Mathematics, 11 (2), 86-97.
32. Ojha, N. C. (2000). Development of instructional material for teaching economics to class IX through concept attainment model in relation to achievement, retention, self-concept and attitude of students towards economics. Unpublished Doctoral Dissertation, Indian Educational Abstracts, 2(1), 36-37.
33. Prabhakaram, K. S., & Rao, Bhaskara Digumathi. (1998). Concept attainment model in mathematics teaching. New Delhi: Discovery Publishing House.
34. Prasanth, P. S. (2004). Effectiveness of synectics model in enhancing creative thinking among students learning English poetry at secondary level (Unpublished M. Ed thesis). University of Kerala, Thiruvananthapuram.