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Effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Vth Grade Students

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Abstract

The major objective of present study is to investigate the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Vth Grade Students. The study had been compared the effect of Concept Attainment Model and Conventional Method (CM) on achievement in Environmental Science subject. The effectiveness of CAM has also been investigated in terms of gender. The present study is quasi-experimental and pre-test post-test control group design. The present study has been conducted on 68 students (35 students in experimental group and 33 students in control group) of Vth class of Environmental science of a school affiliated to C.B.S.E. Board and situated at Meerut District, Uttar Pradesh. It was found that Concept Attainment Model was effective to improve Achievement in Environmental Science of Vth Grade Students. Concept Attainment Model was more effective than Conventional Method to improve Achievement in Environmental Science. There is no significant difference between Boy and Girl Students of Vth Grade in Effectiveness of Concept Attainment Model.

Keywords

Concept Attainment Model (CAM), Conventional Method (CM),Achievement in Environmental Science, Vth Grade Students.

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Introduction

Learning models are teaching models (Joyce & Weil, 2003). Teaching models have provided structural and functional principles for the development of instructional materials. Eggen, Kauchak and Harder (1979) have given six Information Processing Models, i.e. (i) General Inductive Model, (ii) Concept Attainment Model, (iii) Taba's Inductive Thinking Model, (iv) General Deductive Model, (v) Ausubel's Advance Organiser Model and (vi) Suchman's Inquiry Training Model.

So Concept Attainment Model (CAM) is an Information Processing Model. Experimental psychology is a name for information processing in general. Information processing is an important concern, element and need of teaching pedagogy and affects not only cognitive structure but also affective and psycho-motor processes. Information processing models are constructed so that they support the learners' information processing abilities and enhance their capacity to master knowledge. Concept Attainment is designed to clarify concepts and introduce content elements. It helps learners to develop a concept by the use of illustrations, word cards or specimens known as examples.

Concept Attainment is a constructivist approach. Concept Attainment Model (CAM) was developed by Jerome Bruner in 1960. The Concept Attainment Model was mainly designed by Jerome Bruner to develop inductive reasoning. But Concept Attainment Model is also used to develop a concept and to analyse the concept. As Bruner (1993) said, children should be able to acquire and receive knowledge which will be arranged into stable mental structures which help them to solve the problems. The use of the right technology in educational process is very important to aid in teaching concepts. This model can help students to learn a concept by searching and identifying the characteristics of a concept on the basis of attribute and attribute-value . Concept attainment is "the search for and listing of attributes that can be used to distinguish exemplars from non-exemplars of various categories" (Bruner, Goodnow, and Austin, 1967, Bruce, Marsha, Emily, 2013, pp-108).
Concept Attainment Model (CAM) focuses on classification of events, and classification is based on the classification of the attributes of the concept (Patel, 2015). (Gulwani 2019) 'Concept attainment model is a system of instruction which includes the strategies such as examples, attributes, attribute-value and generalisation of a concept'.

Each concept has attribute and attribute-values. In Concept Attainment, we are looking for the attributes of the concepts in the positive and negative examples. Each example (negative or positive) is represented by attribute and attribute-values. So the students get the concept by classifying and generalising the concepts based on its attribute and attribute-values. In present study researcher investigate the effectiveness of CAM on Achievement in Environmental Science.

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Review of Related Literature: Wanjari (2005) found that Concept Attainment Model was more effective than Traditional Method with respect to Achievement in Science. Kalani (2009) stated that CAM was better than Conventional Method for improving Achievement in Science of VII standard students. Mukherjee (2011) has found that CAM was effective in improving the Achievement in Science of secondary level students. Prabhakaran (2011) found that CAM was more effective than the Traditional method in helping secondary level students to attain concepts of Mathematics. Kumar & Mathur (2013) revealed that the Concept Attainment Model was more effective than the Traditional Method for teaching Physics Concepts. Gajjar (2015) found that Concept Attainment Model was more effective than Traditional Method in teaching Gujarati Language. Patel (2015) developed a teaching package in science for X class using Concept Attainment Model and found CAM significantly effective in science teaching. Swarnalatha (2015) found that Concept Attainment Model enhanced Achievement in Biological Science. Bhargava (2016) found that CAM is more effective than Traditional Method (TM) for improving Achievement in Social Science of IX class students. Alam (2017) showed that CAM was effective to improve Achievement in Science of IX class students. Bodhale (2017) found that Concept Attainment Model was effective in Biology teaching. Joseph (2017) found that Concept Attainment Model is more efficient than Traditional Method in teaching English Grammar. Kaur (2017) studied the effect of CAM on Academic Achievement in Physics of IX class students and found CAM to be more effective than Traditional Method. There was a significant difference between CAM and Traditional Method on Achievement in Physics of XI class students, according to Bhaskara (2018). Kaur (2018) found CAM more effective than traditional method in case of Achievement in Chemistry of IX class students. Praveen (2018) found that CAM was more effective than the Traditional Method in improving the IX class students' Achievement in Social Science. Gulwani (2019) found that Concept Attainment Model was more effective than Traditional Method with respect to educational achievement in selected concepts of English. Habib (2019) found that CAM was more effective than Traditional Method to improve Achievement in Social Science of XII standard students. Thakkar (2020) found that CAM was more effective than Traditional Method to improve Academic Achievement in Business Organization and Management. Noreen & Chaudhary (2021) conducted a study to find out the effectiveness of CAM. They found that CAM is more effective than Traditional Method (TM) to improve Academic Achievement in Economics of XI standard students. Patel (2023) found Concept Attainment Model is more effective than Traditional Method in science teaching and there is no significant difference between boy and girl students with reference to Achievement in Science. The present study aims at finding out the effectiveness of CAM on Achievement in Environmental Science of V grade students and also to compare the effectiveness of CAM and CM.

Rationale of the Study: The Concept Attainment Model (CAM) was developed to help students learn and attain concepts more effectively and to teach concepts. This study is an effort in this direction to improve Environmental science teaching. In Environmental science teaching concepts are important. The present study is an effort to find the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science and it was conducted among Vth Grade students. In present study researcher also compared the effectiveness of Concept Attainment Model (CAM) and Conventional Method (CM) on Achievement in Environmental Science. Also investigated is the Effect of Concept Attainment Model (CAM) on Achievement in Environmental Science with respect to gender. The findings of the present study help the teachers and students to improve Achievement in Environmental Science with Concept Attainment Model (CAM).

Statement of the Problem: Effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Vth Grade Students.

Objectives:

1. To measure the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Vth Grade Students.
2. To measure the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Boy Students of Vth Grade.
3. To measure the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Girl Students of Vth Grade.
4. To compare the effect of Concept Attainment Model (CAM) and Conventional Method (CM) on Achievement in Environmental Science at Vth Grade Students.
5. To compare the effect of Concept Attainment Model (CAM) and Conventional Method (CM) on Achievement in Environmental Science at Boy Students of Vth Grade.
6. To compare the effect of Concept Attainment Model (CAM) and Conventional Method (CM) on Achievement in Environmental Science at Girl Students of Vth Grade.
7. To compare the effect of Concept Attainment Model (CAM) on Achievement in Environmental Science at Boy and Girl Students of Vth Grade.

Hypotheses:

$H_0$1: There is no significant difference between pre and post test mean scores of Achievement in Environmental Science of Vth Grade Students taught Concept Attainment Model (CAM).

$H_0$1.1: There is no significant difference between pre and post test mean scores of Achievement in Environmental Science of Boy Students of Vth Grade taught Concept Attainment Model (CAM).

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$H_0$1.2: There is no significant difference between pre and post test mean scores of Achievement in Environmental Science of Girl Students of Vth Grade taught Concept Attainment Model (CAM).

$H_0$2: There is no significant difference between Mean Gain Scores of Achievement in Environmental Science of Vth Grade Students taught through Concept Attainment Model (CAM) and Conventional Method (CM).

$H_0$2.1: There is no significant difference between mean gain scores of Achievement in Environmental Science of Boy Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

$H_0$2.2: There is no significant difference between mean gain scores of Achievement in Environmental Science of Girl Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

$H_0$3: There is no significant difference between mean gain scores of Achievement in Environmental Science of Boy and Girl Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

Methodology:

Research Design: This is a Quasi-Experimental Research and Pre-Test Post-Test Control Group Design has been used.

Population: Population of present study is Vth Grade students with Environmental science from the schools affiliated to C.B.S.E. Board and located in Meerut District, Uttar Pradesh.

Sample and Sampling Technique: Investigator employed Purposive Sampling Technique to select the representative sample. In present study, 68 students of Vth Grade with Environmental Science have been selected from a school affiliated to C.B.S.E. Board namely Meerut Public School, Meerut, as a sample, out of which 35 students (18 Boy and 17 Girl Students) in experimental group (Section A) and 33 Students (17 Boy and 16 Girl Students) in control group (Section B).

Delimitations: Present study has been delimited to Vth grade students of Meerut District, U.P., of the schools affiliated to C.B.S.E. Board. Present study has been delimited to the subject Environmental Science only.

Research Procedure: There are two intact classes; Section A and Section B, Section A has been selected as an experimental group and Section B as control group. Researcher selected ten concepts (Animals, Snake Charmer, Water, Gravitation, Space, Uses of Metals, Farming, Seeds, Plants, and Forests)of Environmental Science from NCERT Book of V grade. These particular concepts have been taught in Section A with Concept Attainment Model and in Section B through Conventional Method and, collect the relevant data

(implemented Environmental Science Achievement Test developed by S. C. Gakhar and Bineeta) before and after the teaching-learning process.

Tools Used: In present study, Environmental Science Achievement Test (ESAT–GB) developed by S. C. Gakhar and Bineeta has been used. This test contains 43 items of 14 areas. It was administered on 174 students of Vth&VIth class. This Environmental Science Achievement Test (ESAT–GB) available in English.

Data Analysis and Interpretation:

$H_0$1: There is no significant difference between pre and posttest mean scores of Achievements in Environmental Science of Vth Grade Students taught Concept Attainment Model (CAM).

To test the above-mentioned hypothesis, researcher compared pre-test scores and post-test scores as given in following Table 1.

Table 1: Comparison of Pre and Post Test Mean Scores of the Students of Experimental Group

Groups (Experimental group)	N	Mean	Standard Deviation	t Value	Result
Pre-Test Scores	35	11.26	1.82	8.05	*Rejected
Post-Test Scores	35	15.37	2.41		

Rejected at 0.01 level of significance

According to Table 1, degree of freedom is 68 and calculated t-value is 8.05. To reject null hypothesis at degree of freedom 68, t–value should be greater than 2.65 (0.01 significance level). Hence the above-mentioned hypothesis rejected at '0.01 significance level'. Therefore, Concept Attainment Model (CAM) is significantly effective to improve Achievement in Environmental Science atVth Grade Students.

$H_0$1.1: There is no significant difference between pre and post test mean scores of Achievement in Environmental Science of Boy Students of Vth Grade taught Concept Attainment Model (CAM).

To test the above mentioned hypothesis, researcher compared pre-test scores and post-test scores of Boy Students of Experimental Group as given in following Table 2.

Table 2: Comparison of Pre and Post Test Mean Scores of Boy Students of Experimental Group

Groups (Experimental group)	N	Mean	Standard Deviation	t Value	Result
Pre-Test Scores of Boy Students	18	11.17	1.89	4.96	*Rejected
Post-Test Scores of Boy Students	18	14.94	2.62		

*Rejected at 0.01 level of significance

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According to Table 2, degree of freedom is 34 and calculated t-value is 4.96. To reject null hypothesis at degree of freedom 34, t–value should be greater than 2.72 (0.01 significance level). Hence the above mentioned hypothesis rejected at '0.01 significance level'. Therefore Concept Attainment Model (CAM) is significantly effective to improve Achievement in Environmental Science at Boy Students of Vth Grade.

$H_0$1.2: There is no significant difference between pre and post test mean scores of Achievement in Environmental Science of Girl Students of Vth Grade taught Concept Attainment Model (CAM).

To test the above mentioned hypothesis, researcher compared pre-test scores and post-test scores of Girl Students of Experimental Group as given in following Table 3.

Table 3: Comparison of Pre and Post Test Mean Scores of Girl Students of Experimental Group

Groups (Experimental group)	N	Mean	Standard Deviation	t Value	Significance Level
Pre-Test Scores of Girl Students	17	11.35	1.80	6.56	*Rejected
Post-Test Scores of Girl Students	17	15.82	2.16		

Rejected at 0.01 level of significance

According to Table 3, degree of freedom is 32 and calculated t-value is 6.56. To reject null hypothesis on degree of freedom 32, t–value should be greater than 2.75(0.01 significance level). Hence the above mentioned hypothesis rejected at '0.01 significance level'. Therefore Concept Attainment Model (CAM) is significantly effective to improve Achievement in Environmental Science at Girl Students of Vth Grade.

$H_0$2: There is no significant difference between mean gain scores of Achievement in Environmental Science of Vth Grade Students taught through Concept Attainment Model (CAM) and Conventional Method (CM).

To test the above mentioned hypothesis, researcher compared the difference of Post-test Scores and Pre-test Scores of Experimental Group and Control Group as given in following Table 4.

Table 4: Comparison of Mean Gain Scores of Experimental Group and Control Group

Groups	N	Mean	Standard Deviation	t Value	Significance Level
Experimental Group	35	4.11	1.47	5.46	*Rejected
Control Group	33	2.42	1.03		

Rejected at 0.01 level of significance

According to Table 4, degree of freedom is 66 and calculated t-value is 5.46. To reject null hypothesis at degree of freedom 66, t –value should be greater than 2.65 (0.01

significance level). Hence the above mentioned hypothesis rejected at '0.01 significance level'. Therefore to improve Achievement in Environmental Science of Vth Grade Students Concept Attainment Model (CAM) is more effective than Conventional Method (CM).

$H_0$2.1: There is no significant difference between mean gain scores of Achievement in Environmental Science of Boy Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

To test the above mentioned hypothesis, researcher compared the difference of Post-test Scores and Pre-test Scores of Experimental Group and Control Group of Boy Students as given in following Table 5.

Table 5: Comparison of Mean Gain Scores of Boy Students of Experimental Group and Control Group

Gender Boy Students	**N**	**Mean**	**Standard Deviation**	**t Value**	**Significance Level**
Experimental Group	18	3.78	1.48	4.21	*Rejected
Control Group	17	2.06	0.83		

Rejected at 0.01 level of significance

According to Table 1, degree of freedom is 33 and calculated t-value is 4.21. To reject null hypothesis at degree of freedom 33, t –value should be greater than 2.72 (0.01 significance level). Hence the above mentioned hypothesis rejected at '0.01 significance level'. Therefore to improve Achievement in Environmental Science at Boy Students of Vth Grade, Concept Attainment Model (CAM) is more effective than Conventional Method (CM).

$H_0$2.2: There is no significant difference between mean gain scores of Achievement in Environmental Science of Girl Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

To test the above mentioned hypothesis, researcher compared the difference of Post-test Scores and Pre-test Scores of Experimental Group and Control Group of Girl Students as given in following Table 6.

Table 6: Comparison of Mean Gain Scores of Girl Students of Experimental Group and Control Group

Gender Girl Students	**N**	**Mean**	**Standard Deviation**	**t Value**	**Significance Level**
Experimental Group	17	4.47	1.42	3.72	*Rejected
Control Group	16	2.81	1.11		

Rejected at 0.01 level of significance

According to Table 6, degree of freedom is 31 and calculated t-value is 3.72. To reject null hypothesis at degree of freedom 31, t –value should be greater than 2.75 (0.01 significance

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level). Hence the above mentioned hypothesis rejected at '0.01 significance level'. Therefore to improve Achievement in Environmental Science at Girl Students of Vth Grade, Concept Attainment Model (CAM) is more effective than Conventional Method (CM).

$H_0$3: There is no significant difference between mean gain scores of Achievement in Environmental Science of Boy and Girl Students of Vth Grade taught through Concept Attainment Model (CAM) and Conventional Method (CM).

To test the above mentioned hypothesis, researcher compared the difference of Post-test Scores and Pre-test Scores of Boy and Girl Students of Experimental Group as given in following Table 7.

Table 7: Comparison of Mean Gain Scores of Boy and Girl Students of Experimental Group

Groups (Experimental group)	N	Mean	Standard Deviation	t Value	Significance Level
Boy Students	18	3.78	1.48	1.41	*Accepted
Girl Students	17	4.47	1.42		

Accepted at 0.05 level of significance

According to Table 7, degree of freedom is 33 and calculated t-value is 1.41. To reject null hypothesis at degree of freedom 33, t–value should be greater than 2.72 (0.01 significance level). Hence the above mentioned hypothesis accepted at '0.05 significance level'. Therefore there is no significant difference in the effectiveness of Concept Attainment Model (CAM) to improve Achievement in Environmental Science at Boy and Girl Students of Vth Grade.

Results: The data analysis revealed that Concept Attainment Model (CAM) was significantly effective and Concept Attainment Model (CAM) was more effective than Conventional Method (CM) in improving Achievement in Environmental Science. In present study, effect of Concept Attainment Model (CAM) and comparison of Concept Attainment Model (CAM) and Conventional Method with reference to Achievement in Environmental Science have also been analysed on the basis of gender. It was found that Concept Attainment Model (CAM) was significantly effective and Concept Attainment Model (CAM) was more effective than Conventional Method (CM) to improve Achievement in Environmental Science at Boy and girl students separately. It was also observed that there was no significant difference in the effectiveness of Concept Attainment Model (CAM) to improve Achievement in Environmental Science of Boy and Girl Students of Vth Grade.

Conclusion

The effectiveness of CAM and the effectiveness of CAM and CM on Achievement in Environmental Science has been investigated in the present study and compared. The results

of present study supports the results of Wanjari (2005), Kalani (2009), Mukherjee (2011), Prabhakaran (2011), Kumar & Mathur (2013), Gajjar (2015), Patel (2015), Swarnalatha (2015), Bhargava (2016), Alam (2017), Bodhale (2017), Joseph (2017), Kaur (2017), Bhaskara (2018), Kaur (2018), Praveen (2018), Gulwani (2019), Habib (2019), Thakkar (2020), Noreen & Chaudhary (2021), Patel (2023). It was found that Concept Attainment Model (CAM) was significantly effective to improve Achievement in Environmental Science at Vth Grade students. The result showed that Concept Attainment Model (CAM) was more effective than Conventional Method (CM) to improve achievement in Environmental Science. It was further found that there was no significant difference in effectiveness of Concept Attainment Model (CAM) to improve Achievement in Environmental Science of Boy and Girl Students. Therefore, it is suggested to use Concept Attainment Model (CAM) to improve Achievement in Environmental Science at Vth Grade students in order to improve teaching of Environmental Science and to attain concepts of Environmental Science Concept Attainment Model (CAM). Further studies are also suggested to be conducted in other subjects, levels, regions, I.Q. levels, educational boards, rural and urban areas etc. to investigate more deeply the effectiveness Concept Attainment Model.

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