EFFECTIVENESS OF CONCEPT ATTAINMENT MODEL OVER ACTIVITY METHOD FOR LEARNING ENVIRONMENTAL POLLUTION AT SECONDARY LEVEL

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Abstract: *The goal of environmental education is to develop a world population that is aware of and concerned about the environment and its associated problem and has the knowledge, skills, attitude, motivation, and commitment to the world individually and collectively towards the solution of current problems and preservation of new ones. The formation of concepts about pollution is very crucial in protecting the environment from a local and global perspective. The concept attainment model is intended to teach concepts and help students become more efficient at learning and forming concepts.*

Key Words: *Concept Attainment Model (CAM), Activity Method (AM), Pollution.*

1. INTRODUCTION:

Learning is the process of bringing changes in behaviour through experience or teaching. The changes allied with our direct and indirect experiences and formal attempts of practice and teaching can only result in quite stable and enduring changes in our behaviour and that is why such types of changes are likely to be associated with the processes and product of learning. The process of learning does not end in one cycle. It is a never-ending and continuous process that needs to be carried out for bringing changes in one's behaviour in facing never-ending changes and situations of one's life.

Models of teaching have been defined in different ways by research workers who worked in the area of teaching. "Model of teaching can be defined as an instructional design which describes the process of specifying and creating particular situations which cause the students to interact in such a way that a specific change occurs in their behaviour".

A teaching model is a kind of detailed plan of teaching a lesson that could lead to effective learning. According to Joyce and Weil (1972) –"Teaching model is a pattern or plan which can be used to shape a curriculum or course to select instructional materials and to guide a teacher's actions."According to them, teaching models are simply instructional designs. They define the process and producing particular environmental situations which cause the student to interact in such a way that specific change occurs in the behavior of the students

Joycee and Wail (1986) grouped all the teaching models into four broad categories. These are - Information Processing Models, Social Interaction Models.Personal Development Models and Behavior Modification Models.
Concept Attainment Model (CAM)

The CAM was developed from the work of Jerome Bruner, Jacquline Goodnow and George Austine. It comes under the category of Information Processing Models. It is also known as Bruner's Concept Attainment Model. Concept Attainment is an indirect instruction strategy that uses a structured inquiry process. This model is designed to lead students to a concept by asking them to compare and contrast examples that contain the characteristics or attributes of the concepts with examples that do not contain these attributes. It is based on the assumption that one of the best way to learn a concept is by observing examples of it.

The 'Concept Attainment Model' developed by Bruner and his associates have three variations:
a) Reception Model is more direct in teaching students the elements of a concept and their use in concept attainment.
b) Selection Model permits students to apply this awareness of conceptual activity in a more active context, one that permits their initiation and control.
c) Unorganised Material Model The analysis of concepts in unorganised data transfers concept theory and attainment activity to real-life settings.

Fundamental elements of Concept Attainment Model
Syntax
Phase 1 : Presentation of data and identification of concept

•   Teacher presents labeled examples to start the process. Students compare attributes in positive and negative examples from the labeled exmples and they form their hypothesis and test the hypothesis with the examples given. Students are encouraged to identify the essential attributes of the oncept and make definition according to the attribute Phase 2 : Testing attainment of the concept

•   Then the teacher presents a set of unlabeled examples. Students identify additional unlabelled examples as yes or no based on the definition they have fromed during Phase I. Then the teacher confirms hypotheses, names concepts, and restates definitions according to essential attributes. Students are encouraged to generate more examples Phase 3 : Analysis of thinking strategies

•   Students are encouraged to describe their thinking process. Students discuss the role of hypotheses and attributes. Students discuss in detail the type and number of hypotheses they have formulated and the process of finding the essential attributes of the concept they have formed.

Social System

Before using the model the teacher chooses the concept, selects and organizes the material into positive and negative examples and organizes the examples. When using the concept attainment model, the teacher acts as a recorder, keeping track of the hypotheses as they are mentioned and of the attributes. The teacher also supplies additional examples as needed. The three major functions of the teacher during concept attainment activity are to record, prompt, and present additional data.

Principles of Reaction

During the flow of the lesson, the teacher needs to be supportive of the students hypotheses – emphasizing, however, that they are hypothetical in nature – and to create a dialogue in which students test their hypotheses against each other.

Support System

Concept attainment lessons require that positive and negative examplars to be presented to the students. When students are presented with an example, they describe its characteristics which can be recorded.

Application

The use of the concept attainment model determines the shape of particular learning activities. For example, if the emphasis is on acquiring a new concept, the teacher will emphasize through his or her questions or comments the attributes in each example and the concept label.

Environmental Pollution

The environment encompasses the total of all conditions and influences which affect the development and life of all organisms on earth. The environment has multidimensional aspects and the perception varies from man to man. Environment performs different functions to man such as recreation and aesthetics, source of natural resources, and sink for waste produced by human activities. Education for environmental awareness is required not only for environmental scientists, engineers, policymakers, or Non-Governmental Organisations (NGOs) but also for every one of us. The only environmental study can make us conscious and careful about the environment. Environmental education is aimed at developing environmental ethics in people. It teaches them the importance of the conservation of life and the biodiversity of the environment. The environmental study also teaches people to understand their role in the environment and learn to live with limited natural resources to avoid future disasters. The casual attitude of human beings towards the environment and its conservation is the root cause of all environmental problems. While meeting the ever-growing needs, we put pressure on the environment. When the pressure exceeds the carrying capacity of the environment to repair or recycle itself, it creates serious problems of environmental degradation. Therefore proper education and public awareness are necessary to tackle environmental problems. For a sustainable environment and the survival of the present and future generations, environmental education is necessary. The aim of environmental education is the development of behavior following the environmental needs and the transfer of our knowledge and experience into everyone's life. So, environmental education should be connected to the problems from an individual's life situation. (Vashist, 2003).

Pollution is an unwanted and undesirable change that is happening in the physical, chemical and biological components of the environment. There are different types of pollution such as air, water soil and light. All these are destroying the natural environment land altering the climate worldwide. Environmental pollution is a major threat faced by developed and developing countries around the world. We are fully aware of the threat of pollution but things are beyong our control. Industrialisation and urbanization are increasing all types of pollution day by day. We have seen many examples of pollution in our countries itself like the one that happened in Delhi and Bombay. Still, we are not

acting considering the sustainable development of the country. Educating the mass and creating awareness in the general public is the only solution to the growing pollution problem. Environmental concepts are taught from a very young age in school but still, there is some lack in attaining the concept to the implementation level. We have to bridge this gap and the environmental concepts are to be built in a practical-oriented approach among the students.

2. LITERATURE REVIEW:

The Concept Attainment Model is an effective strategy to teach the concepts of Environmental Education. Thomas (2005) conducted the effectiveness of Concept attainment model and test book method in Chemistry the study concluded that teaching through Concept attainment model is more effective than the textbook method for the achievement of Chemistry. The Concept Attainment Model of instruction was very effective to develop the cognitive ability of academically disadvantaged students Minikutty (2005). The study conducted by Mathew (1999) on the comparative effectiveness of the Advanced Organiser Model and Concept attainment model in the teaching of population education at secondary level showed that AOM and Concept attainment model is superior to traditional methods of teaching at Higher Secondary level.

3. HYPOTHESES OF THE STUDY:

- When the treatment groups Concept Attainment Model Group (CAM) and Activity Method Group (AM) are exposed to experimental teaching (based on total sample) there will be significant difference between CAM and AM with regard to pre-test achievements.
- When the treatment groups (Concept Attainment Model Group (CAM) and Activity Method Group (AM) are exposed to experimental teaching (based on total sample) there will be significant difference between CAM and AM with regard to post-test achievements.
- When the treatment group Concept Attainment Model (CAM) group is exposed to experimental teaching (based on total sample)there will be significant difference between pre and post-test achievements.
- When the treatment group Activity Learning Group (AM) is exposed to experimental teaching (based on total sample) there will be significant difference between Pre-and Post-test achievements.
- When the Concept Attainment Model Group (CAM) is exposed to experimental teaching(based on sub-samples) there will be significant difference between Pre and Post- test achievements.

  H(i). There will be significant difference between male and female students with regard to post-test achievements

  H(ii) There will be significant difference between rural and urban students with regard to post-test achievements

  H(iii) There will be significant difference between English and Malayalam medium students with regard to post-test achievements

4. OBJECTIVES OF THE STUDY:

- To prepare a Concept Attainment Model lesson transcript for learning Environmental Pollution at Secondary level
- To find the effectiveness of Concept Attainment Model for learning Environmental Pollution at secondary level by comparing the Achievement of Concept Attainment Model Group(CAM) with that of Activity Method Group (AM) for the total sample
- To test the effectiveness of Concept Attainment Model for learning Environmental Pollution at secondary level by comparing the Achievement of the Concept Attainment Model Group (CAM) for sub-samples based on:

  (i)   Gender
  (ii)   Locale
  (iii)   Medium of Instruction

5. METHOD:

Experimental method of research was employed for the present study. In the present study, a Non-equivalent pre-test post-test experimental design was used. Before the experiment, the Achivement test (for 25 mars) was given as a pre-test. The experimental treatment i.e. teaching through Concept Attainment Model was given to the experimental group and the control group was taught through the Activity Method. Two groups were taught on the alternative days for three weeks and after that, the same Achievement test was administered as a post-test to the two groups.

5.1 TOOLS USED FOR THE STUDY

- Lesson transcript based on Concept Attainment Model for teaching Pollution at Secondary Level

- Lesson transcript based on Activity Method for teaching Pollution at Secondary Level
- Achievement test in Pollution for VIII standard students. The same achievement test was used as pre-test and post-test

5.2 SAMPLE SELECTED FOR THE STUDY

The sample for the present study comprised of VIII standard students. Stratified random sampling technique was used for selecting the sample giving due representation to gender, locale, and medium of instruction. Details of sample selected for the study is given in the following table

Table 1 Sample selected for the study

		Experimental	Control
Gender	Male	55	50
	Female	53	47
	Total	108	97
Locale	Rural	57	53
	Urban	51	44
	Total	108	97
Medium of Instruction	English	52	43
	Malayalam	56	54
	Total	108	97

5.3 STATISTICAL TECHNIQUES USED

Mean, SD, and t-test were used to assess the significant differences between the variables under study.

6. ANALYSIS AND DISCUSSION OF RESULTS :

The present study is intended to find the Effectiveness of Concept Attainment Model over Activity Method for learning Environmental Pollution at Secondary Level.   The data collected were analyzed and interpreted according to the objectives of the study.

1.Comparison of Pre-test Achievement Scores of Concept Attainment Model Group(CAI) and Activity Method Group (AM) - Total Sample

Table 2 t-test between the means of CAM and AMG on Pre-test

Treatment Group				C.R.	Level of significance
CAM		AM			
Mean	SD	Mean	SD		
4.91	1.79	4.84	2.15	0.18	p<0.05

Statistical analysis of data (Table 2) revealed that there is no significant difference between CAM and AM with regard to their Pre-test Achievement Scores (C.R=0.18; p<0.05). It can be concluded from the analysis that CAM and AM are more or less equal in terms of Pre-test Achievement Scores.

Tenability of Hypothesis

The t-test between the means of CAM and AM revealed that the two groups do not differ significantly with regard to Pre-test Achievement Scores. Hence hypothesis formulated in the context viz., H(1) is rejected.

2. Comparison of Post-test Achievement Scores of Concept Attainment Model(CAM) and Activity Method Group (AM) - Total Sample

Table 3 t-test between the means of the CAM and AM on Post-test Achievement Scores- Total Sample

Treatment Group				C.R.	Level of significance
CAM		AM			
Mean	SD	Mean	SD		
25.09	3.68	20.06	245	8.32	p<0.01

It is evident from Table 3 that there is significant difference between CAM and AM with regard to their Post-test Achievement Scores. (C.R= 8.32. P<0.01). The difference is in favour of CAI. This can be attributed to the influence of CAM. Hence it can be concluded from the analysis that CAM is superior to AM in terms of Post-test Achievement. Tenability of Hypothesis

The t-test between the means of CAM and AM revealed that the two groups differ significantly with regard to Post-test Achievement Scores. Hence hypothesis formulated in this context viz., H(2), is accepted.
3. Comparison of Pre-test and Post-test Achievement Scores of Concept Attainent Model (CAM) – Total Sample

Table 4 t-test between the means of Pre-test and Post-test Achievement Scores of CAM- Total sample

Treatment Group				C.R.	Level of significance
CAM					
Pre-test		Post-test			
Mean	SD	Mean	SD		
4.91	1.79	25.09	3.68	36.69	p<0.01

Statistical analysis of the data Table 4 revealed that there is significant difference between the Pre-test and Post-test Achievement Scores (CR=36.69; P<0.01). The difference is in favour of Post-test Achievement. The difference can be attributed to the effect of CAM

Tenability of Hypothesis

The t-test between the means of Pre- test and Post Achievements revealed that, Post - test Achievement Scores of CAM is significantly superior to Pre-test Achievement Scores. Hence the hypothesis formulated in this context viz., H(3)., is accepted.
4. Comparison of Pre-test and Post-test Achievement Scores of Acivity Method Group (AM) – Total Sample

Table 5   t-test between the means of Pre-test and Post-test Achievement Scores of AM- Total sample

Treatment Group				C.R.	Level of significance
AM					
Pre-test		Post-test			
Mean	SD	Mean	SD		
4.84	2.15	20.06	2.45	33.09	p<0.01

Statistical analysis of the data (Table 10) revealed that there is difference between the Pre test and Post-test Achievement Scores of AM group (CR= 33.09; P<0.01). The difference is in favour of Post-test Achievement

Tenability of Hypothesis

The t-test between the means of Pre-test and Post-test Achievement Scores of AM is significantly superior to Pre-test AchievementScore. Hence the hypothesis formulated in this context H(4) is accepted.
5 Comparison of Post-test Achievement Scores of CAM - (Sub Samples)

To determine whether variables like Sex, Locale, and Medium of instruction affect the Post-test Achievement of students, the differential effect of the above-mentioned variables was studied. The details regarding the data and results of the test of significance for difference between the means on Post-test scores for the Sub Samples of CAM are given below.

Table 6 Test of significance for difference between the means of Post-test achievement of CAM- Subsamples

Sl.No.	Variables	Category	Mean	SD	CR	Level of significance
1	Gender	Male	25.92	1.33		
		female	24.61	1.21	3.78	p<0.01
2	Locale	Rural	25.68	1.36		
		Urban	25.41	1.51	0.69	p>0.05

3	Medium of Instruction	English	25.97	1.25		
					2.98	p<0.01
		Malayalam	24.75	1.61		

It is evident from Table 6 that the critical ratio was obtained for gender (CR 3.78, p <0.01). In the case of variables Sex, for the difference is in favour of the Male students For locale (CR- 0.69 p>0,01), which means no significant difference is noticed Regarding the variable. That is the critical ratio obtained for the medium of instruction (CR 2.98, p <0.01). In the case of variables medium of instruction the difference is in favour of the Male students For locale (CR- 0.69 p>0of English medum students

Tenability of Hypotheses
The t-test between the means of CAM (Sub Samples) on Post-test Achievement revealed that the variable Gender and Medium of Instruction differ significantly on Post-test Achievement. Hence hypotheses formulated in this context viz., H5(i) and H5(iii) are accepted.
The t-test between the means of CAM (Sub Samples) on Post-test Achievement revealed that the variable locale does not have any significant influence on Post-test Achievement. Hence hypothesis formulated in this context viz., H5(ii0 is rejected,

7. FINDINGS :
- Comparison of mean scores based on the total sample of the treatment group CAM and AM on the pre-test achievement revealed that there is no significant difference between CAMand AM in terms of pre-test achievement scores
- Comparison of mean scores based on the total sample of the treatment group CAM and AM on the post-test achievement revealed that CAMis significantly superior to AM in terms of f post-test achievement scores
- Comparison of means of pre-test and post-test achievement of CAM revealed that there is significant difference between pre-test and post-test achievement scores and the difference is in favour of post-test achievement.
- Comparison of means of pre-test and post-test achievement of AM revealed that there is significant difference between pre-test and post-test achievement scores and the difference is in favour of post-test achievement.
- Comparison of the means of the subsamples of CAM on post-test Achievement revealed the following points :
  - There is significant difference between the scores obtained by male and female students on Post-test chievement when the groups were exposed to CAM. Male students are seen better in performance.
  - There is no significant difference between the scores obtained by Rural and Urban students in their Post-test Achievement when the groups were exposed to Concept Attainment Model
  - There is significant difference between the scores obtained by English and Malayalam medium students on Post-test Achievement when the groups were exposed to CAM. English medicum students are seen better in performance

8. SUGGESTIONS AND EDUCATIONAL IMPLICATIONS :
The present study is a limited one due to many factors. Therefore, the researcher offers the following suggestions for consideration for further similar studies.

- Larger samples can be taken for a longer time to confirm the results of the present study.
- A comparative study of Concept Attainment Model and activity Method on sub-samples like types of schools i.e.govt, private and aided schools, and stream of study like State, CBSC, ICSC etc. can be considered.
- Effectiveness of Concept Attainment Model can be studied in comparison to other models of teaching.
- The effectiveness of the model can be tested with different topics

From the present investigation based on the findings, it can conclude that the Concept Attainment Model is more effective than the activity Method in fostering conceptual learning efficiency in environmental pollution. Teachers must be encouraged to use models of teaching for conceptual clarity and making the learning more meaningful. The investigator would be happy and satisfied if the findings of the study would lead to a better understanding of the importance of using models of teaching in the classroom for making the learning process a meaningful exercise,

REFERENCES:

1. Adams, W. M. (2003). Green Development: environment and sustainability in the Third World. London, Routledge.
2. Best, John W. (2006). Research in Education. Englewood cliffs, New Jersey. Prentice-Hall.
3. Dell'Olio, J. M., & Donk, T. (2007). Models of teaching: Connecting student learning with standards. Thousand Oaks: Sage Publications.
4. Joyce, B. R., Weil, M., & Calhoun, E. (2000). Models of teaching. Boston: Allyn and Bacon.
5. Mangal, S.K. (2010). Essentials of Educational Technology. New Delhi, Asok Ghosh PHI Learning Pvt. Ltd.
6. Minikutty, A.(2005). Effect of Concept Attainment Model of Instruction on achievement in Mathematics of Academically Disadvantaged students of secondary schools in the Kerala State. Ph.D Thesi Faculty of Education. Mahatma Gandhi University, Kottayam. Retrieved from http://shodhganga.inflibnet.ac.in/handle/10603/6637
7. Patel, M. (2014). Effect of Concept Attainment Model of Teaching on Achievement in Chemistry at Higher Secondary Stage. International Journal for Research in Education, Vol. 3, Issue: 7, December: 2014. Retrieved from www.raijmr.com
8. Vashisht, N. (2003). A study of Environmental awareness among adolescent students. Unpublished M.Ed. dissertation, H.P. University, Shimla.