

# Concept Attainment Model (CAM) and Inquiry Training Model (ITM) in Teaching Biological Science at the Secondary Level in Odisha

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## ABSTRACT

The present study investigates the effectiveness of the Concept Attainment Model (CAM) and Inquiry Training Model (ITM) in teaching Biological Science at the secondary level. A mixed-method approach was adopted, combining a descriptive survey with a quasi-experimental design. The survey included 100 teachers across Nuapada district, while the experimental component involved 180 students from classes IX and X, divided into experimental and control groups. Data were collected through questionnaires, achievement tests, and feedback sheets, and analyzed using descriptive statistics, t-tests, and qualitative variation analysis. Findings revealed that teachers predominantly rely on lecture-based methods, with limited use of innovative models, though they acknowledged the potential of CAM and ITM for enhancing student engagement and conceptual understanding. Experimental results demonstrated that students taught through CAM and ITM achieved significantly higher post-test scores compared to those taught by traditional methods, with notable gains in inquiry skills, scientific attitude, and hypothetical thinking. Student perceptions further confirmed that these models made learning more enjoyable, interactive, and effective. The study concludes that CAM and ITM are superior to conventional methods in fostering meaningful learning of Biological Science and recommends structured training programs, workshops, and curriculum integration to support teachers in adopting these models for everyday classroom practice.

**Keywords:** Concept attainment Model, Inquiry Training Model, Biological science, Secondary level.

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## INTRODUCTION

The present research was conducted to study the effect of CAM and ITM in teaching of Biological Science at Secondary level. Descriptive survey-experimental research design (quasi experimental) was employed. For the realization of the study, a sample of 100 teachers for survey purpose was selected whereas, 180 students (90 class IX, 90 class X) from 2 schools were selected for experimentation. The major data collecting tools were questionnaire and achievement test (experimental study). The collected data were analyzed by using both descriptive and inferential statistics. In addition, qualitative analysis (by variation) was used. Teacher and student engagement is critical in the classroom because it has the power to define whose knowledge will become a part of school related knowledge and whose voices shape it. Students are not just young people for whom adults should devise solutions. They are critical observers of their own conditions and needs, and should be participants in discussion and problem solving related to their education and future opportunities. Hence, children need to be aware that their experiences and perceptions are important and should be encouraged to develop the mental skills needed to think and reason independently and have the courage to dissent. Participatory learning and teaching, emotion and experience need to have a definite place in the classroom. While class participation is a powerful strategy, it loses its pedagogic edge when it is ritualized, or merely becomes an instrument to enable teachers to meet their own ends. True participation starts from the experiences of both students and teachers (National Curriculum Framework 2005, pp-22-23). The text book development committee, Odisha in their foreword they enlightened the teachers that it is a primary duty of teachers to devise teaching-learning processes which arouse children's natural interest of learning things.

The official documents of National and State Curriculum Framework 2005 and Right to Education Act 2011 are aspiring to bring grass root changes in science teaching. They have also said that the textbooks were adopted in accordance with such an aspiration. Hence, science teachers need to adapt to the new approaches in their teaching (IX and X Biology textbook,

Govt. of Odisha). Teaching is not just to sit on an armchair with a cup of tea in hand to sip. It is an art and skill to be learnt. It requires the knowledge of subject content, method, techniques and teaching aids to be used for making teaching interesting and effective. This is the main objective of education. For this purpose, the teachers need a variety of approaches. Several models of teaching have been developed out of which Bruce Joyce and Marsha Weil's (1980) have been to be very effective. Development of models of teaching is the recent innovation in teaching. An important purpose of discussing models of teaching is to assist the teacher to have a wide range of approaches for creating a proper interactive environment for learning. An intelligent use of these approaches enables the teacher to adopt him to the learning needs of the students (Yogesh Kumar, 2013, IJRE, pp-125).

In the constructivist learning situation, the role of a teacher is facilitating the learning for learners to reflect analysis and interpret in the process of knowledge construction. Both the models of teaching, namely the Concept Attainment and Inquiry Training, are very near to constructivist approach of teaching and learning process because they provide opportunity for learners to question, enquire, reflect and learn (National Curriculum Framework,2005).In the above mentioned two models, the role of the teacher is facilitator of the group learning. In groups the children learn from each other, such as team work and social values learning tasks can be designed in such a way that children are encouraged to seek out knowledge from other sites other than textbooks, in their own experience, at home, community, in libraries etc. These communicate the philosophy that learning and knowledge are to be sought out, authenticated there by constructed and neither textbook or the teacher is an authority. 189 It is observed that, during the last two decades many researchers conducted research on Models of Teaching and all of them have established their effectiveness and superiority over normal teaching methods; yet in actual classroom situations they are seldom used (Buch M.B., 1983, p-20). Therefore there is need to use them in everyday teaching. The teacher need to be made aware on the usage of model of teaching because of its efficacy in normal classroom situations and are practical and usable. Hence, the researcher aims to take up to develop the modules for training programme for Biological Science teachers. Biological Science teachers and students are curious by nature to explore and find out the insights in the nature. These are the Models of Teaching to train well the teachers in order to make learning more effective. In view of this aspect, the researcher has chosen the area of research pertaining to the Concept Attainment Model and Inquiry Training Model for the teaching of Biological Science in Secondary schools in Nuapada District.

#### **Objectives of the Study :**

To assess the perceptions of Biological Science Teachers towards to the usage of Models of teaching.

To study if there is a statistically significant difference in the mean scores on the post-test between the experimental and control groups of standard IX students when taught using Concept Attainment Model and Traditional method respectively.

To study if there is statistically significant difference in the mean scores on the post-test between the experimental and control Groups of standard X students when taught using Concept Attainment Model and Traditional method respectively.

To examine if there is a statistically significant difference in the mean scores on the post-test between the experimental and control Groups of standard IX students when taught using Inquiry Training Model and Traditional method respectively.

To investigate if there is a statistically significant difference in the mean scores on the post-test between the experimental and control Groups of standard X Students when taught using Inquiry Training Model and Traditional method respectively.

To know the perceptions of students about the usefulness of Biological Science teaching through CAM and ITM.

#### **METHOD**

Experimental Design:- The researcher has made use of - experimental design for this study purpose. Two Groups' randomized matched Groups were selected for this study, i.e. Equivalent Group design was used (Kaul, 2005, p.150).

Sample and Sampling Procedures: Survey: With regard to Survey the population and sample particulars are described in detail.

Population: All the teachers teaching Biological Science. The relevant data was collected from the teachers teaching Biological Science.

Sample:.. The researcher has selected all the three revenue divisions of the Srikakulam District for her study purpose. The researcher has also selected 24 Mandals out of the total 38 mandals from the three revenue divisions viz. Palakonda, Tekkali and Srikakulam of the Srikakulam district by adopting simple random sampling technique.

C) Teachers teaching Biological Science in the various schools of the selected mandals (Purposive Sample) were considered as the sampled respondents to know their perceptions. The researcher selected the teachers, who are handling the Biological Science subject at secondary level. Every school is having one Biological Science Teacher, where as some schools where the strength is high such schools possessing two teachers. First the researcher classified and arranged the district into Revenue division wise, later all were arranged in an alphabetical order. By adopting random sampling method, the researcher selected 24 Blocks covering from three Districts. The Researcher selected 48 schools covering from 24 Blocks from Three Districts. The total selected sampled Teachers comprises of 175. The researcher collected data from the 175 respondents to know the existing situation in the teaching of Biological Sciences through Models Of teaching. Experiment: - With regard to the Experimental study, the procedure and the sample particulars are described in detail are as follows. Training Programme -Preparation and Implementation: The researcher selected 4 schools from the Palakonda revenue division of Srikakulam district for her Experimental study purpose. Out of 4 schools selected 2 schools were considered as an Experimental Group schools and 2 schools were selected as Controlled Group schools. The researcher has selected 45 students of IX and X class each covering for both Experimental Group and Control Groups. The total sampled respondents consist of 360 students. For experimentation of CAM and ITM 90 students from class IX and 90 students from class X selected randomly. The researcher employed the Matched random sampling procedure. For Control group the researcher selected 90 students of class IX and 90 students of class X. For experimentation the sample consists of 180, and also for Control group the sample consists of 180.

**Experimental Method:** The Experimental design found to be the most effective for this particular study was the pre-test, post-test Equivalent Group design. This design minimizes threats to the experimental validity. In this design, two Groups are randomly formed from the total available Group. One of the two Groups is treated as an Experimental Group and the remaining as a Control Group. The researcher prepared question papers for class VIII and IX on the selective units to know the achievement levels of students. The researcher administered pre-test among all the selective students both in experimental and controlled schools. The procedure which was adopted for collection of data and other aspects were mentioned clearly. The researcher followed the procedure systematically in the teaching of Biological Science concepts through CAM and ITM in experimental schools. These experimentation procedures were followed in all the experimental schools. After completion of the experimentation the researcher conducted post-test in both the experimental and controlled schools to know the attainment levels of students in Biological Science concepts. Later, the researcher analyzed the data to know the differences in the attainment levels by deploying the appropriate statistical techniques. Experimental Study: This study was conducted on experimental basis at the experimental stage, the researcher prepared lesson plans and many activities for teaching purpose. The researcher trained the selected school teachers to prepare lesson plans for the classes VIII and IX for the teaching of Biological Science concepts using CAM and ITM models where experimentation starts. The researcher designed CAM and ITM models for the enhancement of concept attainment and inquiry skills through science teaching. And the students of experimental group were taught through CAM and ITM models where as the students of controlled group were taught through traditional method. Sample : The present investigation designed to conduct a research study on Models of Teaching and developing Biological Science teaching. The investigator restricted her study to conduct on the selected secondary schools for experimentation. 196 The samples of schools were selected in Srikakulam on the basis of representativeness. The schools selected working under both Government and management were on the basis of random sampling. The samples selected for the study are as follows: The researcher selected Nuapada District for experimentation. The district consists of number of schools working under different managements, where as the researcher has selected Government schools for her study purpose. The researcher selected four schools for experimental and controlled study purpose. The researcher selected 45 students from each selected school from IX and X where CAM and ITM Biological Science teaching was experimented. The researcher selected the sample for pre-test and post-test purpose.

**Data Gathering Tools:** The following tools were used for this research study purpose (A) For the Survey Questionnaire: The researcher designed and developed a simple questionnaire to know the existing situation through the perceptions of teachers teaching Biological Science working in schools situated in the three revenue divisions of the Srikakulam district. This data helped the researcher in planning for conduct of Experimental study. (B) For the Experiment: Phase I: Training Programme:- Biological Science teachers were trained in the selected schools on the theoretical and practical knowledge on the Models of Teaching i.e. on CAM and ITM. Phase- II: The trained teachers conducted experiment in teaching the lessons using CAM and ITM for IX and X class students. (C) Feedback after the Experimentation from the sample students:- The feedback sheet was developed to know the usefulness of the Models of Teaching, the clarity on the lessons based using Inquiry Training Model and Concept Attainment Model. This was developed in order to know the perceptions of the students of IX and X class on the effectiveness of CAM and ITM at school level. To find out the effectiveness of CAM and ITM Models, the researcher has developed Achievement tests for the classes VIII and IX students on selected topics for administration.

## STATISTICAL TECHNIQUES FOR ANALYSIS

The researcher adopted the following statistical techniques for analytical purposes. The statistical techniques mainly were: Percentages, Averages, Standard Deviation, t-test. 5.11. MAJOR FINDINGS: Findings of the data collected from the Teachers: 1. 2. It was noticed that, in the teaching of Biological Science at Secondary Level, the most commonly used methods was Discussion, Lecture and Lecture cum Demonstration methods, whereas, it is clearly shows that, models of teaching in the teaching of Biological Science was not using by the teachers who are teaching Biological Science at the Secondary level. It was noticed that, the teachers revealed they are adopting only Lecture cum demonstration method and also using scientific methods in the teaching of Biological Science. The teachers were also revealed that they are not using any models of teaching in the teaching of concepts. A large number of teachers expressed that, teaching Biological Science Subject through innovative models should become more effective than that of the teaching Biological Science through regular methods to understand the concepts by the students effectively. 3. 198 Observed that, more than half of the percentage of teachers revealed that they are adopting innovative teaching practices for teaching Biological Science in the schools. Infer that, majority of the teachers expressed that the Concept Attainment model is very useful model for the teaching of Biological Science subject.

The teachers also revealed that both Inquiry Training model and Advance Organization model are also very useful for the teaching of Biological Science subject. It shows that, the teachers are having an idea in the usage of models of teaching. The teachers revealed that, they encounter the problems when adopting Models of teaching viz) Time management, coverage of syllabus, preparation of lesson plans. It shows that, the application of Models of teaching in the teaching of Biological Sciences is practically difficult and become more innovative. Majority of the teachers expressed that; government should conduct special workshops on models of teaching for expertisation and for effective implementation of Models of Teaching in the teaching of Biological Science in secondary schools. Majority of the teachers revealed that, conduct of separate training programmes covering on the preparation of lesson plans on the Models of teaching, acquisition of theoretical knowledge, Time Management and training in teaching Biological Science concepts confidently are helpful to teachers to teach Biological Science in secondary schools. Majority of the teachers suggested that, Experts guest lectures, Workshop on the preparation of lesson plans using Models of teaching and Orientation on Models of Teaching are useful to teach Biological Science in secondary schools. More than sixty six percent of the teachers suggested that, Demonstration lessons by Experts using CAM & ITM are useful to teach Biological Science in secondary schools.

It indicates that, Demonstration lessons are to be organized by the experts using CAM&ITM at school complex levels. It was noticed that all most all the teachers are having the perceptions that, Education Departments should take lead in training the teachers on the Models of Teaching. The experts from the University Departments should give training on the usage of Models of Teaching may be useful to acquire professional competencies for effective implementation. Revealed that majority of the teachers are not aware on the models of Teaching and also not aware on the books which are available covering the content on the Models of Teaching. Majority of the teachers expressed that, they can not complete class IX and X syllabus of Biological Science by using CAM & ITM Models of Teaching. Majority of the teachers expressed that application of Models of Teaching should become a regular practice in the teaching of Biological Science in Secondary schools. Majority of the teachers expressed that the usage of Models of Teaching in the teaching of Biological science in Secondary schools, helps the students for the development of scientific attitude, where as Some teachers revealed that usage of the Models of teaching is very useful for creating conducive atmosphere in the class room and also helps the students for the development of hypothetical thinking. Majority of the teachers expressed that, the Units in the Text Books of class IX & X have not designed on the Models of Teaching for 200 teaching Biological Science in Secondary Schools.

It shows that the Units in the Class IX & X Text Books are not written on the lines of Models of Teaching for teaching Biological Science in secondary schools. Majority of the teachers expressed that, Models of teaching enable the teacher to inculcate scientific thinking process and inspires the children to adopt scientific approach for learning the concepts of Biological Science. Models of Teaching is enable the teacher to observe and record children's learning abilities during various activities conducted in the classroom, laboratory and field as a part of Continuous Comprehensive Evaluation (CCE). 93.14% of the teachers expressed that, Models of Teaching are enabling the teacher in making the student to develop their own Mind Mappings. Majority of the teachers expressed that, Models of Teaching are enabling the teacher to analyze each and every concept in the Text Book in depth to some extent only. It was noticed that, majority of the teachers expressed that, Models of Teaching enable the teacher in planning the activities for children such that they can understand the concepts properly.

**Findings of Experimental Study.** Experimental and Controlled Groups did not differ significantly in attaining the achievement scores in the teaching of Biological Science in Class VIII. Experimental group is superior in attaining the scores when using CAM than that of the controlled group. 24. Experimental and Controlled Groups are not showing statistically significant difference in attaining the achievement scores in the teaching of Biological Science in Class IX. 4.

201 Experimental group attained the higher achievement scores in the teaching of Biological Science in using the CAM than that of the controlled group students of class IX. Experimental and Controlled Groups are significantly not differed in attaining the achievement scores in the teaching of Biological Science in Class VIII. Experimental Group students are superior in attaining the achievement scores in the teaching of Biological Science in using the Inquiry Training Model in Class IX. Both the Experimental and Controlled Groups did not differ significantly in attaining the achievement scores in the teaching of Biological Science in Class IX. Experimental group students are superior in attaining the achievement scores in the teaching of Biological Science in using the Inquiry Training Model in Class IX than that of the controlled group students. The attainment levels of class VIII students in the Post-Test was high comparatively than that of the Pre-Test when teaching Biological Science concepts through CAM.

It shows that, the CAM Model influenced among the students to achieve higher scores in Biological Science concepts. The attainment levels of class IX students in the Post-Test was high comparatively than that of the Pre-Test when teaching Biological Science concepts through CAM. It shows that, the CAM Model influenced among the students to achieve higher scores in Biological Science concepts. The attainment levels of class VIII students in the Post-Test was high comparatively than that of the Pre-Test when teaching Biological Science concepts through ITM. It shows that, the ITM Model influenced among the students to achieve higher scores in Biological Science concepts. 12. 202 The attainment levels of class IX students in the Post-Test was high comparatively than that of the Pre-Test when teaching Biological Science concepts through ITM. It shows that, the ITM Model influenced among the students to achieve higher scores in Biological Science concepts. IX class students perceived high towards teaching Biological Science at Secondary Level through the Models of Teaching than that of IX class students. Girl students perceived high towards teaching Biological Science at Secondary Level on the Models of Teaching than that of Boy students.

There is significant difference between students perceptions based on their class with gender towards teaching Biological Science at Secondary Level on the Models of Teaching. Class IX girl students perceived better than that of the rest of the class and gender category. IX class girl students perceived high towards teaching Biological Science at Secondary Level on the Models of Teaching than that of IX class boy students. IX class boy students expressed high perceptions towards teaching Biological Science at Secondary Level on the Models of Teaching than that of IX class boy students. X class girl students expressed high perceptions towards teaching Biological Science at Secondary Level on the Models of Teaching than that of IX class boy students. Class IX girls and class X boys both the category respondents did not differ significantly towards teaching Biological Science at Secondary Level on the Models of Teaching. Class IX girl students and class IX girl students the category respondents did not differ significantly towards teaching Biological Science at Secondary Level on the Models of Teaching. X class girl students expressed high perceptions towards teaching Biological Science at Secondary Level on the Models of Teaching than that of IX class boy students. Findings on the perceptions of students on the usage of models respondents (90.56%) revealed that, application of Models of teaching by the teachers in the teaching of Biological Science concepts, helping the students to understand the concepts easily. Majority of the students (87.78%) agreed that, they are enjoying the learning when teaching the Biological Science concepts through Models of Teaching than the usage of traditional methods. Majority of the students (91.11%) revealed positively that the Learning abilities and also the level of interest enhances among students, when teaching the Biological Science concepts by applying CAM and ITM models. 82.78% of the students agreed that teaching through Models of Teaching enhances the quality of teaching of Biological Science. 63.89% of the students revealed that teachers are adopting more innovative practices in the teaching/planning of Biological Sciences.

Majority of the students (89.44%) agreed that teaching through models making the students think hypothetically in understanding the concepts. 88.89% agreed that most of the Units of class IX and X Biological Science subject are covered to teach through Models of Teaching. Majority of the students (57.78%) agreed that teachers facing difficulty in identifying the Units for effective transmission of concepts through Models of Teaching. 43.33% of the students agreed that when teaching through Models of Teaching, most of the time the teacher is deviating from the concepts. Majority of the students (92.22%) agreed that learning Biological Science concepts are easier through the usage of Concept Attainment Model and Inquiry Training Model. 11. 204 90.56% of the students agreed that when adopting concept attainment and inquiry training models of teaching are suggesting many projects as a practical activity to the students to perform on their own. Majority of the students (73.33%) agreed that teaching of Biological Science concepts through CAM and ITM making the students to understand the lesson in depth. 82.22% of the students agreed that learning of Biological Science concepts through CAM and ITM clarifying the doubts and also helps in developing hypothetical thinking. Majority of the students (65.00%) agreed that time is not sufficient to concentrate on the activities covering both in CAM and ITM. 72.22% of the students agreed that learning of Biological Science concepts through CAM and ITM enables the students in developing mind mapping. 67.78% of the students agreed that Learning of Biological Science concepts through CAM and ITM enables the student in analyzing the concepts systematically. Majority of the students (73.33%) agreed that Learning of Biological Science concepts through CAM and ITM enable the student to utilize scientific concepts in daily life situations. Majority of the

students (83.33%) agreed that learning of Biological Science concepts through CAM and ITM enable the student to appreciate man power and nature, and developing aesthetic sense towards nature. 61 . 91.11% of the students agreed that learning of Biological Science concepts through CAM and ITM enable the student to realize the importance of Biodiversity. Majority of the students (91.11%) agreed that learning of Biological Science concepts through Models of Teaching is encouraging the students to think and work scientifically.

### **CONCLUSIONS**

The purpose of Scientific research is to derive verified and verifiable generalizations. An educational research worker has to exercise care and caution in formulating the conclusions and arriving at any generalizations on the basis of the data collected. Conclusions should be presented in somewhat more detail and care should be taken to draw all conclusions directly from the findings over concluding must be avoided. Presentations of conclusions form the heart of any research report. Skillful grouping and appropriate sub-ordinate conclusions under major headings are essential in avoiding encyclopedic, enumeration of dozens of individual statements. The specific purpose of the present investigation is to study the effect of Concept Attainment model and Inquiry Training model in teaching Biological Science at secondary level.

The following are the conclusions drawn by the investigator. The results of the study have revealed that the teachers are using mainly traditional methods than any Models of Teaching in the teaching of Biological Science concepts and they expressed that innovative teaching techniques are to be adopted so that the students can understand the concepts easily. Majority of the teachers expressed that, Models of Teaching both Concept attainment and inquiry training models enables the teacher to inculcate scientific thinking process and they can create conducive atmosphere in the classroom through these techniques. The results of the study have revealed that both the models of teaching CAM and ITM are enabling the teacher in planning the activities for children, and they have also agreed that these techniques are enabling the teacher to analyze each and every concept so that the students can form their own Mind Mappings. The results of the study have showed that Models of Teaching are enabling the teacher to do continuous and comprehensive evaluation by observing and recording children's learning abilities during various activities conducted in the classroom. The results of the study have proved that both the models of teaching CAM and ITM are more effective than the Conventional method in teaching of Biological Science concepts at Secondary level.

The results of the study have showed that, there is statistically significant difference in the mean scores of the post-test between the experimental and control groups of Class VIII and Class IX when Biological Science was taught by using CAM and ITM. The results of the study have revealed that, majority of the students positively responded that learning of Biological Science concepts through the models of teaching CAM and ITM enabling them to think and work scientifically. The study showed that there is significant difference between students perceptions based on their class with gender towards teaching Biological Science at Secondary level on the models of Teaching. Class IX students perceived better than that of the rest of the class and gender category. By the proper use of these approaches the teacher can overcome the differentiation of the class gender. Majority of the students have expressed that, application of Models of Teaching by the teachers in the teaching of Biological Science, helping them to understand the concepts easily. Majority of the students positively agreed that Models of Teaching enhances the quality of teaching of Biological Science. This study has revealed that, these approaches CAM and ITM provided wide opportunity to students for acquiring concepts, interpreting the data and applying the principles in new differential situations.

### **EDUCATIONAL IMPLICATIONS**

This study can be said to have implications for science education in particular and other disciplines in general, for teacher educators, teachers, research workers, curriculum developers and planners. The important purpose of discussing models of Teaching is to assist the teacher to have a wide range of approaches for creating a proper interactive environment. Students also get more involved in higher order thinking skill when they see the teacher as the model. Through these approaches the students get examples presented and also get to differentiate among the hierarchical order of information. The child grows and his brain experiences intellectual development and he/she starts to construct mental structures through his /her interaction with the environment. An intelligent use of these approaches enables the teacher to adopt to him to the learning needs of the students. The CAM and ITM are very much useful teaching models for enhancing the students achievement. Hence, the teachers must use the teaching models which are appropriate. Models of Teaching are applicable to the Indian classrooms because of its instructional applicability, and suitability. The programme outline may also be useful for planning the future training programmes in other models also. The policy makers and administrators must plan and implement the models of teaching in school subjects for the enhancement of learning abilities.

## SUGGESTIONS

Basing on the observations made, the statistical analysis done and the conclusions drawn the investigator is of the perceptions, that the following suggestions will go a long way for the effective implementation of the Models of teaching both CAM and ITM 1. As many of the teachers are not aware of the Models of Teaching, The Government should conduct workshops on Models of Teaching for expertisation and for effective implementation. 2. Many of the teachers have suggested that, Demonstration lessons by experts using CAM and ITM are useful to teach Biological Science in Secondary schools. It indicates that, Demonstration lessons are to be organized by the experts using CAM and ITM at school complex levels. 3. It is suggested that, teachers need more number of In-service Programmes covering on the innovative practices and also on the application of various Models of Teaching for practice at their school level. 4.

As many of the researchers saw the benefits of using CAM and inquiry- based teaching the investigator has pointed out that the teachers should first look at the organization of the classroom and make sure that the seating arrangement is going to help children transition easily from one activity to the other. 5. In order to facilitate concept attainment and inquiry-based learning, the teachers should make simple changes and organize the classroom in a way so that they could manage transition and gain attention as the children use hands- on- investigative activities, use of science journals, and use of group- based activities to guide students and to reflect on their learning process. 6. It is suggested that, the teachers should get support from school administration in creating the learning environment suitable for implementing the innovative teaching techniques. 7. It is suggested that, both the in-service and pre-service teachers should be exposed to Models of Teaching so that they can develop hands-on activities for their science classroom.

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