

## THE SYNECTICS MODEL OF TEACHING IN PHYSICS IN RELATION TO THEIR ACHIEVEMENT IN PHYSICS AMONG HIGHER SECONDARY SCHOOL STUDENTS

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### Abstract

The purpose of secondary school physics teaching is not only to enable students to systematically grasp the basic knowledge of physics needed to further study science and technology, but also to unsettle young people's minds and inflame their minds. In the present study the research investigator use Synectic Model teaching comparing with traditional method by using the Experimental Method in higher secondary school student the sample is this study. Eighty (80) higher secondary school students have been chosen by using random sampling techniques. Results revealed that there is a significant difference between the control and experimental group of XI standard science students with respect to the Achievement test in Physics. It is also resulted that the girls are found to be better than the boys on achievement test in physics. The educational implication and suggestion for further research were discussed.

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### INTRODUCTION

From ancient era till now many teachers and educational institute follow the teaching methods which were truly based on teacher centered approach where child has a passive role in classroom. Nowadays there are many teaching models were adopted for teaching by different subject teacher's. A teaching model is not a substitute for teaching skill. A model cannot take the place of fundamental qualities in a teacher, such as, knowledge of subject matter, creativity and sensitivity to people. But it is a good tool to help good teachers to teach more effectively by making their teaching more systematic and efficient.

'Models' are teaching-strategies designed to accomplish particular instructional goals. The Synectics model has the ability to awaken the "creative thinker" in every student, using guided techniques and activities and to create a safe environment for all students.

Synectics instructional model rejects the assumption that teachers provide knowledge and students merely stores it (Seligmann, 2007). It is based on the constructivist philosophy that advocates learners discover and construct their own versions of knowledge by their own experiences and observations and by forming personal

connections between new and existing knowledge (Walker, 2009). In this model, it is aimed that stimulating creative thinking skills of students by making individuals bring different perspectives (Joyce, Weil and Calhoun, 2009) and by using metaphors, analogies, and contrasts related to the subject (Rajput, 2013). The model can be used to create motivational learning environments for students because it brings new and creative perspectives to complex subjects that are difficult to learn (Nolan and Williams, 2010). In the application steps of the model, it is aimed that encouraging students to actively participate in learning processes and to create collaborative learning environments through sharing of different opinions about the subject at the same time (Patil, 2012). In this way, students are expected to value each other's opinions and develop empathy (Tumanger and Ernidawati, 2012).

According to Eisner, schools should foster logical and creative thinking ability of students in what they see, hear and read. Students must learn to be the architect of their own education (Gordon, 1961). Unfortunately, traditional and limited methods of educational systems deprive students of thinking, being creative and probing. In other words, instead of learning thinking and creativity they only save some scientific facts and concepts in their mind (Shabani, 2003). One of the suitable methods by which we can increase creativity processing method is called Synectics which is a new teaching method and was developed by William J. Gordon and et al (1961). Gordon named it the familiarity bleaching (Salahshouri, 2001) that is to say a

person tries to get familiar with new vision and creative thinking. This manner is formed by activities and metaphorical analogy (Agha Soltani, 2003).

Four factors is underlying in theory and technique of Synectics.

- ❖ ***Involvement and detachment***: This mode refers to the relationship between the individual and a problem on which is worked.
- ❖ ***Deferment***: A risk for immediate and rapid resolution of a problem is that proposed solutions will be crude and superficial (Gedo, 1996).
- ❖ ***Thought***: Group and its members require to allow their mind to be free so that ideas and solutions can easily enter into the mind
- ❖ ***Autonomy of object***: As creative process goes and solutions are presented there is a feeling of whether these solutions have the necessary quality to solve the problem.

The four psychological stages is common with creative process (Aggarwal, 2008).

Basic Synectics Process can be discussed in two *phases* like

- i) ***Make the Strange Familiar***: Understand the problem – analytical phase. Understand the problem until you are at home with it.
- ii) ***Make the Familiar Strange***: Distort, invert or transpose the everyday ways of looking and responding. Techniques to make the familiar strange are

- Personal Analogy – see yourself as the spring.
- Direct Analogy – use animals or other devices.
- Symbolic Analogy – use constructs or symbols.
- Fantasy Analogy – invent something that could be used as an analogy.

Steinberg said that achievement encompasses the ability and performance of the student, it is multidimensional, it reflects the whole child, it is not related to a single instance, but occurs throughout time and level through the life of a student in school and post-secondary and working years. Thus achievement in physics among the higher secondary students try to break down the entire universe into a set of fundamental, mathematical laws that explain the smallest and largest things in the universe.

### **PURPOSE OF THE STUDY**

Knowledge of physics is essential, for it is a part of science. The purpose of secondary school physics teaching is not only to enable students to systematically grasp the basic knowledge of physics needed to further study science and technology, but also to unsettle young people's minds and inflame their minds. Understanding physics helps students in learning and fulfilling the intrinsic desire of interest and imagination, and the experience obtained through scientific process strengthens intellectual honesty, positive attitudes, social skills etc. A Physics student should be in a position to observe, think logically, draw conclusions and make the right decisions. This will enhance their reading process not only on

Physics subject, but also to improve their overall development.

Achievement test is a proficiency test used to test the ability and to determine what and how much has been mastered and how well a task can be achieved. The emphasis of the test is on the part of the assessment. Achievement test in physics can be described as a test used to measure the degree of mastery of skills, basic concepts, general knowledge, specific abilities and student success in the subject of physics.

### **RESEARCH QUESTIONS**

1. Is there is any significant difference between control and experimental group on achievement test in physics?
2. Is there is any significant difference between boys and girls on achievement test in physics for experimental group?

### **METHOD USED FOR THE STUDY**

In the present study the research investigator using Experimental Method in higher secondary school student the sample is this study. Eighty (80) higher secondary school students have been considered the present study.

### **SAMPLE**

The researcher selected two schools one is Government and other one is Private school are selected for the study in Chenkalpattu district. Eighty students are selected both government and private school with the help of purpose random sampling techniques.

### **TOOLS**

The investigator has chosen the subject topics from the syllabus prescribed by

the Text book of the Tamil Nadu State Board. Those subject topics are important to the research. The test is composed of eighty multiple choice questions. The marks allocated for the test is 80. Students are expected to write their responses in separate sheets. The scoring varied between 0 and 1. Score 1 represents correct response and score 0 represents incorrect response.

### EXPERIMENTAL PROCEDURE

To find out the difference in the Achievement test in physics learning through Synectics Model and through conventional method, the researcher adopted the two groups Pre-test and Post-test experimental design.

### STATISTICAL TECHNIQUES

The collected data were tabulated and manipulated statistically. To find the significance difference between the experimental and control groups, the developed null hypotheses were tested. The statistics done are Mean, Standard Deviation, „t“-test was found. t-test to measure the significant difference between the mean values.

### ANSWER TO THE RESEARCH QUESTIONS

**Question 1:** *Is there is any significant difference between control and experimental group on achievement test in physics?*

Table -1

Mean difference between Control and Experimental group on Achievement test in Physics.

Variable	Control group		Experimental group		t-value	P value
	Mean	SD	Mean	SD		
Achievement test in Physics	41.05	3.88	59.30	7.27	14.709	0.001**

### Significant at 1 % level

It is inferred that the mean scores of the experimental group (59.30) is higher than the control group (41.05) of the XI standard students in terms of their achievement test in physics. Here, the experimental group has given better results in the achievement test in physics than the control group which is significant at 1% level. Hence, there is a significant difference between the control and experimental group of XI standard science students with respect to the Achievement test in Physics.

**Question 2:** Is there is any significant difference between boys and girls on achievement test in physics for experimental group?

Table -2

Mean difference between Boys and Girls on Achievement test in Physics for Experimental Group

Variables	Gender				T- value	P value
	Boys		Girls			
	Mean	SD	Mean	SD		
Achievement Test	68.09	6.34	73.66	7.79	6.222	0.017*

### Significant at 5 % level

It is inferred that the mean scores of the girls (73.66) is higher than the boys (68.09) of the XI standard students in terms of their achievement test in physics. Here, the girls are found to be better than the boys on achievement test in physics which is significant at 5% level. Hence, there is a significant difference between the boys and girls of XI standard science students with respect to the Achievement test in Physics for the experimental group.

### FINDINGS AND CONCLUSION

In new educational approaches, teaching Synectics is viewed as a valuable activity to develop student's academic achievement. The results of this study showed that in the subject of Physics, students who were trained using Synectics processing methods compared with ones trained using lecturing method not only had significant achievements but also received training in components of fluidity and originality. Furthermore, it is noted that there is significant difference between boys and girls were girls to be more are seems to be more effective than boys on achievement in Physics. It is suggested education provide training periods to make teachers familiar with Synectics method so that they use it in their classes. Undoubtedly, it will be resulted in more achievement in Physics which ultimately improve their academic achievement in all the subjects. The structure and the functional application steps enables' the XI standard Physics students to be active in the learning process, it can be said that the synectics instructional model plays an important role in the students'

qualified and permanent learning in regards to the achievement in Physics.

### EDUCATIONAL IMPLICATION

- ❖ The findings and researchers' experience, it was realized that synectics model adopted for teaching Physics could be used as a prewriting technique despite points to be cautious about.
- ❖ One way to ensure this could be through distributing the scientific phenomena produced during each session to students and directing and motivating them to learn Physics. As Physics is one of the interesting subjects which enhance the ability to understand the Science facts around us.
- ❖ As each session tends to last long, students might show signs of fatigue and boredom. With the purpose of overcoming this problem, some adaptations could be made. For example, teachers should set time limits for groups for brainstorming and idea generation so that the planned lesson time should not be exceeded. Alternatively, the groups could be kept fixed for a determined period of time in order not to lose time for arranging groups in each session.
- ❖ Teacher monitoring is also required and a set of rules for choosing ideas to offer to class during in-group idea generation processes should be established.

## SUGGESTION FOR FURTHER RESEARCH

- ✓ The synectics model can be applied for the other subjects also.
- ✓ The research can be undergone with other influencing variables for science achievement.
- ✓ Research can be carried out for other standards in teaching-learning process.

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