

## Effectiveness of Smart Board Instructions in Learning Mathematics among Seventh Standard Students

**K.Thiyagu,**

Assistant Professor [On Contract], Department of Education, Central University of Tamilnadu, Thiruvarur - 610101, Tamilnadu, India

### Abstract

Smart Board is a technological advancement that has significantly affected teaching and learning in the school classroom. A Smart Board or generic version provides quick and easy access to online resources and enables teachers to reach more students by addressing a variety of learning styles. Additionally, their interactive nature provides the opportunity for students to become involved in the instructional process. The present study tries to find out the effectiveness of the Smart Board Instructions in learning Mathematics among Seventh Standard Students. The study was conducted to develop a Interactive White Board Instructions for the selected content of seventh standard textbook, experimenting the same with a set of students studying in the Seventh Standard and finding out its effectiveness over the conventional method of teaching. Two equivalent group experimental-designs are employed for this study. The investigator has chosen 70 Seventh Standard Students for the study. According to the achievement scores level, 35 students were chosen as control group and 35 students were chosen as experimental group. Finally the investigator concludes that; (a) There is no significance difference between the control group and experimental group students based on pre test with respect to the attainment of learning objectives. (b) There is significance difference between the control group and experimental group students based on post test with respect to the attainment of learning objectives.(c) There is the significance difference between the control group and experimental group students based on gain score. (d) There is significance difference between pretest and post test scores of control group students with respect to the attainment of learning objectives. (e) There is significance difference between pretest and post test scores of experimental group students with respect to the attainment of learning objectives.

**KEYWORDS:** Effectiveness, Smart Board Instructions, Learning Mathematics and Seventh Standard Students

### INTRODUCTION

We are living in the modern world. Scientific invention and electronic devices play an important role in our day-to-day life (Krishna Sagar. 2005). Technology has improved a lot. Everyone wants to do something new including the students. So the teacher must make the students to learn with interest and innovation. This can be done only by using scientific technology in their teaching learning process. Smart Boards are becoming an essential component of every classroom. Some reasons for this trend are that: It can accommodate different learning styles (Thiyagu.K. & Arul Sekar. J.M. 2007). Tactical learners can use the screen and learn by touching and marking at the board, audio learners can have a discussion and visual learners can observe the teaching on the board. It is neater and does not have the cleanliness hassle and is therefore easier to maintain.

## NEED FOR THE STUDY

Mathematics is considered as dry subject and most of the students do not show interest on it. This impression about mathematics can be reversed with the help of innovation application of technology in the teaching-learning process. Also the advancement of technology has changed the face of education. The role of teacher is also changed. Yesterday teacher is the only one source of information. But today teacher become a one of the sources of information. Tata Class Edge an innovative and comprehensive educational solution from Tata Interactive Systems (TIS) is designed to help teachers deliver high quality instruction, with an effective blend of classroom activities and interactive multimedia demonstrations (Preston, Chris & Mowbray, Lee. 2008). Based on the Multiple Learning Experiences Model an instructional framework developed by Tata Interactive System. Tata Class Edge aims to enhance students' social and thinking skills along with ensuring a thorough understanding of the curriculum content (Wong, Wylie. 2008). Tata Class Edge creates a system that allows learning to be instantly and continuously assessed and interpreted to identify areas of student strength and weakness. In recent years, computer technology has become a popular tool used to improve the education of students in all the countries. The good news is that there have been advances in educational technology- cloud computing, open source systems, virtualization, analytics that can help our systems refresh outdated infrastructures with new functionality. Introducing the concept of Tata Class Edge where teaching happens through digital instruction materials, 3D animated modules and videos. This is analyzed in the present topic entitled “Effectiveness of Smart Board Instructions in Learning Mathematics among Seventh Standard Students”.

## OPERATIONAL DEFINITION OF KEY TERMS

The following are the operational definition of the key terms of the study.

**Effectiveness:** It refers to the adequacy to accomplish a purpose as well as producing the result intended or expected results. This study measures the effectiveness in terms of the achievement scores of the students if the Smart Board Instruction System in learning is used in learning mathematics.

**Smart Board Instructions:** Instructions through the Tata Interactive White Board (Smart Board) in an ADDIE Model (ADDIE- an acronym for Analyze, Design, Develop, Implement, and Evaluate) way of instructions for the selected content of Tamilnadu State Board Seventh standard text book.

**Mathematics:** Mathematics is a science of quantity, measurement and spatial relations. Mathematics consists of symbols, diagrams, notations and operations (Annie James. 2005).

**Seventh Standard Students:** Students those who are studying in the Seventh Standard after completing the Six Standard in the Tamilnadu State Board Schools.

## OBJECTIVES OF THE STUDY

The following are the objectives of the study.

1. To find out the significance difference between the control group and experimental group students based on pre test with respect to the attainment of learning objectives.
2. To find out the significance difference between the control group and experimental group students based on post test with respect to the attainment of learning objectives.

3. To find out the significance difference between the control group and experimental group students based on gain score.
4. To find out the significance difference between pretest and post test scores of control group students with respect to the attainment the learning objectives.
5. To find out the significance difference between pretest and post test scores of experimental group students with respect to the attainment the learning objectives.

### **HYPOTHESES OF THE STUDY**

Based on the objectives the study the investigator framed the following hypotheses of the study.

1. There is no significance difference between the control group and experimental group students based on pre test with respect to the attainment of learning objectives.
2. There is no significance difference between the control group and experimental group students based on post test with respect to the attainment of learning objectives.
3. There is no the significance difference between the control group and experimental group students based on gain score.
4. There is no significance difference between pretest and post test scores of control group students with respect to the attainment of learning objectives.
5. There is no significance difference between pretest and post test scores of experimental group students with respect to the attainment of learning objectives.

### **METHOD ADOPTED IN THIS STUDY**

To find the effectiveness of Smart Board System, the investigator has chosen Experimental research. Experimental research describes what will be when certain variables are carefully controlled or manipulated. The focus is on variable relationship. Experimental research is the description and analysis of what will be, or what will occur, under carefully controlled conditions (John W. Best & James V. Khan 2004). In the experimental method two or more groups of subjects equivalent in all significant aspects are selected. One of the equivalent groups serves as the control groups and the experimental factors are applied to the other groups one by one for a specified period of time. The investigator has selected two groups of subject's equivalent in their achievement in Mathematics. One group has served as control group and the other as experimental group.

### **SAMPLE SELECTED FOR THE STUDY**

In the present study, the investigator selected the Seventh standard students of James Memorial Matriculation Higher Secondary School at Pragasapuram, Out of the selected students, 70 students were chosen through two groups based on their academic achievement.

### **TOOLS USED FOR THE STUDY**

The following tools are to be used in this study

**Smart Board instructions for the selected content:** In this study the investigator selected mathematical contents to create an active learning environment with an effective blend of innovative Tata interactive white board instruction and multimedia presentation.

**Self -prepared achievement test (pre and posttest) in mathematics:** The investigator has constructed two equivalent forms of tests and each test has 25 multiple choice items. Each item has four alternatives. The questions are prepared in English. Items are submitted to the experts in mathematics. The achievement test was standardized by the investigator. The investigator used the test-retest method for find out the reliability of both pre and post test tool. The correlation values of pretest and post test are 0.71 and 0.76 respectively. Therefore the tool is reliable. Three mathematics professors and the two specialists from education assessed the content validity.

**EXPERIMENT PROCEDURE**

**Conducting Pre-Test:** The investigator has selected the experimental and control groups among VII standard students in James Memorial Matriculation Higher Secondary School, Pragasapuram. There were 35 students in each group. The pre-test was administered to the two groups. The both groups completed the test within 45 minutes.

**Giving Treatment:** After conducting the pretest to both control and experimental groups, the control group was taught the Menstruation and laws of indices topics in Mathematics by using chalk and talk method. For the experimental group students the investigator has used the integrating interactive white board instruction. The treatment has been given 45 minutes per day in the both group. This method has been followed 10 days.

**Conducting Post-Test:** After the treatment the control and experimental groups were given posttest. Their responses were scored with the help of scoring key prepared by the investigator. Practically all of them attempted the entire question in the test that her duration of 45 minutes. The correct answered to the question as give one mark and wrong answer is given zero mark.

**STATISTICAL TECHNIQUES OF THE STUDY**

Statistical techniques helps to classify organize, summarize, the numerical facts and draws conclusions (Aggarwal, Y.P. 1990). Descriptive and differential will be done for the present study. These include.

- Arithmetic Mean,
- Standard Deviation and
- Student “t” test.

**DATA ANALYSES AND FINDINGS OF THE STUDY**

**Null Hypothesis: 1**

There is no significance difference between the control group and experimental group students based on pre test with respect to the attainment of learning objectives.

**TABLE - 1**  
**SIGNIFICANCE DIFFERENCE BETWEEN THE CONTROL GROUP AND EXPERIMENTAL GROUP STUDENTS BASED ON PRE TEST WITH RESPECT TO THE ATTAINMENT OF LEARNING OBJECTIVES**

Objectives	Group	N	Mean	S.D	Calculated ‘t’ value	Remarks 5% level
Knowledge	Control	35	2.15	1.50	0.05	NS
	Experimental	35	2.17	1.60		
Understanding	Control	35	2.14	0.97	0.00	

	Experimental	35	2.14	0.87		NS
Application	Control	35	2.46	1.22	0.47	NS
	Experimental	35	2.31	1.27		

(At 5% Level of significance the table value of 't' is 1.96). (NS-Non significant)

It is inferred from the above table that both the calculated 't' values 0.05; 0.00 and 0.47 are less than the table value 1.96 at 0.05 level of significance. It means that the null hypothesis is to be accepted. Therefore, there is no significance difference between the control group and experimental group students based on pre test with respect to the attainment of learning objectives.

**Null Hypothesis: 2**

There is no significance difference between the control group and experimental group students based on post test with respect to the attainment of learning objectives.

**TABLE - 2**  
**SIGNIFICANCE DIFFERENCE BETWEEN THE CONTROL GROUP AND EXPERIMENTAL GROUP STUDENTS BASED ON POST TEST WITH RESPECT TO THE ATTAINMENT OF LEARNING OBJECTIVES**

Objectives	Group	N	Mean	S.D	Calculated 't' value	Remarks 5% level
Knowledge	Control	35	4.83	1.42	7.51	S
	Experimental	35	8.09	2.13		
Understanding	Control	35	2.80	1.13	5.92	S
	Experimental	35	4.37	1.08		
Application	Control	35	3.37	1.06	3.63	S
	Experimental	35	4.43	1.35		

(At 5% Level of significance the table value of 't' is 1.96). (S-Significant)

It is inferred from the above table that both the calculated 't' values 7.51; 5.92 and 3.63 are greater than the table value 1.96 at 0.05 level of significance. It means that the null hypothesis is to be rejected. Therefore, there is significance difference between the control group and experimental group students based on post test with respect to the attainment of learning objectives. Here for the all objectives, experimental group students are having more mean scores than the control group students.

**Null hypothesis: 3**

There is no significant difference between control group and experimental group students based on gain scores.

**TABLE - 3**  
**SIGNIFICANT DIFFERENCE BETWEEN CONTROL GROUP AND EXPERIMENTAL GROUP STUDENTS BASED ON GAIN SCORES**

Score	Group	N	Mean	S.D	Calculated 't' value	Remarks 5% level
Gain Scores	Control	35	3.49	1.63	11.07	S
	Experimental	35	7.94	1.73		

(At 5% Level of significance the table value of 't' is 1.96). (S-Significant)

It is inferred from the above table that that the calculated 't' value 11.07 is greater than the table value 1.96 at 0.05 level of significance. It means that the null

hypothesis is to be rejected. Therefore, there is significant difference between control group and experimental group students based on gain scores. Here, the experimental group students are having more gain mean scores than the control group students.

**Null hypothesis: 4**

There is no significance difference between pretest and post test scores of control group students with respect to the attainment of learning objectives

**TABLE -4**  
**SIGNIFICANCE DIFFERENCE BETWEEN PRETEST AND POST TEST SCORES OF CONTROL GROUP STUDENTS WITH RESPECT TO THE ATTAINMENT OF LEARNING OBJECTIVES**

Objectives	Test	N	Mean	S.D	Calculated 't' value	Remarks 5% level
Knowledge	Pretest	35	3.71	1.29	4.98	S
	Posttest	35	4.83	1.42		
Understanding	Pretest	35	2.14	0.97	3.08	S
	Posttest	35	2.80	1.13		
Application	Pretest	35	2.46	1.22	3.69	S
	Posttest	35	3.37	1.06		

(At 5% Level of significance the table value of 't' is 1.96). (S-Significant)

It is inferred from the above table that all the calculated 't' values 4.98; 3.08 and 3.69 are greater than the table value 1.96 at 0.05 level of significance. It means that the null hypothesis is to be rejected. It is inferred that there is significant difference within control group students based on pre-test and post-test for attaining the objectives. The students of control group have performed well in the posttest level with that of the pretest level and it is obviously stated that the traditional teaching has been influential in bringing more achievement but the same cannot outshine the students of experimental students who are subjected to TATA interactive system.

**Null hypothesis: 5**

There is no significance difference between pretest and post test scores of experimental group students with respect to the attainment of learning objectives

**TABLE - 5**  
**SIGNIFICANCE DIFFERENCE BETWEEN PRETEST AND POST TEST SCORES OF EXPERIMENTAL GROUP STUDENTS WITH RESPECT TO THE ATTAINMENT OF LEARNING OBJECTIVES**

Objectives	Test	N	Mean	S.D	Calculated 't' value	Remarks 5% level
Knowledge	Pretest	35	4.49	1.56	12.39	S
	Posttest	35	8.09	2.13		
Understanding	Pretest	35	2.14	0.87	10.64	S
	Posttest	35	4.37	1.08		
Application	Pretest	35	2.31	1.27	9.78	S
	Posttest	35	4.43	1.35		

(At 5% Level of significance the table value of 't' is 1.96). (S-Significant)

It is inferred from the above table that all the calculated 't' values 12.39; 10.64 and 9.78 are greater than the table value 1.96 at 0.05 level of significance. It means that the null hypothesis is to be rejected. It is inferred that there is significant

difference within experimental group students based on pre-test and post-test for attaining the learning objectives. The TATA interactive system has been much influential in enhancing more level of achievement in learning mathematics by the experimental students of VII standard and it is apparent that the newest methods have modified not only the achievement in the subject to be learned but also it paves the way for prompt understanding of the subject.

### **EDUCATIONAL IMPLICATIONS**

Tata Interactive White Board Instruction Systems has developed HTML based, accessible online training products and frameworks that enable educational institutions and publishers to effectively serve the evolving needs of student communities worldwide (Giles, Rebecca, M & Shaw, Edward. 2011). E-learning offers the potential to fully realize the paradigm of active learning, a constructivist approach where the learner is in control of the learning (Starkman, Neal. 2006). TATA interactive system has the following advantages over traditional methods:

- Technological: Students use technologies and methods that they use in other areas of their lives
- Instructional: Online networks offer new ways of engaging with the learning material and with peers
- Social: Online networking removes artificial barriers to communication and collaboration
- Practical: Using e-learning, educators can manage quality e-learning education at scale and move beyond place-based learning delivery formats
- Multimodal: Online learning allows for multiple modalities to suit different learning styles such as visual, read/write, and auditory.

### **RECOMMENDATIONS OF THE STUDY**

Based on research outcome of the present study, the following shall be considered for further enhancement of teaching learning process

- To the Institutions: Since the TATA interactive systems are meant for the academic quality, all the educational institutions must possess this sophisticated learning facility that will boost the institutional profile.
- To the teachers: The modern academic systems must be proficiently trained so that the teachers can be an able academic leader in their respective subject.
- To the Parents: The parental involvement in inducting the modern academic facility shall be encouraged so as to realise its significant usages
- To the Students: The present day students must have well trained capability of learning the concepts of any subject through the modern equipment.

### **CONCLUSION**

This study clearly indicated that the Interactive White Board Instructions in teaching Mathematics for students was effective. The effectiveness was found in terms of post-test of the students of experimental group taught through TATA Interactive White Board Instructions. All the reviewed studies also have shown that Multimedia strategy was effective than the lecture method. So, we can conclude that the Interactive White Board Instructions was more effective than the traditional way of teaching. Hopefully more teachers will incorporate Interactive White Board Instructions in which it will occupy predominant position in the regular classrooms. Hence, technology exposure is essential to make the learning process more successful and fruitful.

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