IMPACT OF SMART BOARD TECHNOLOGY ON LEARNING BEHAVIOUR OF SECONDARY SCHOOL STUDENTS

Snigdha Kadam[1], Ph. D. & Bhagwan Balani[2], Ph. D.

[2]Bombay Teachers' Training College Colaba

Abstract

The smart board technology is a way to provide quality education to these students in terms of knowledge, skill and values. **S. Hennessy (2011)** *explored that interactive white board technology opens up opportunities for learners to generate, modify, and evaluate new ideas, through multimodal interaction along with conversation. The aim of the study was to find out impact of smart board technology on learning behavior of secondary school students. The data was collected from 900 students of the secondary schools of STD VII, VIII and IX of SSC, ICSE & CBSE boards of western suburbs of Mumbai district. The findings of the study revealed that there is positive impact of smart board technology on the learning behaviour of secondary school students. From the observations, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VII, VIII and IX of CBSE board is better than that of ICSE board.*

The technology in the field of education is a powerful tool to impart quality education. In the beginning of 21st century, the educational institutions have embarked an adoption of technologies along with the curriculum transaction in the teaching-learning process, thereby increasing level of education. With the Indian perceptive in mind, technology in education will certainly bring a drastic change in the students in terms of their learning behaviour. Few of the institutions who have already adopted these technologies have shown remarkable changes in the educational process.

The state of Maharashtra in western India is home to a number of educational institutions including institutes offering Secondary School Education through different boards such as SSC, ICSE, CBSE and so on. A secondary school is a high school which is ranking between a primary school and a college that is students range between age group 12-16 years approximately, who are techno savvy.

The smart board technology is a way to provide quality education to these students in terms of knowledge, skill and values. Knowledge is the area which can be provided and polished through the best use of smart board technology in education which is an associated tool or

software. It includes Textual content, Activity, Media, Animated Films, Grammar, Math's Lab, Geometry tool box, Quiz, Library, Internet Facility, Worksheets, Gamedge etc.

It enables the student centered teaching approaches which create the interest among secondary school students, in teaching-learning process and offers the opportunities to become confident, skilled and knowledgeable through their lives and carriers. The students of today's world can be touched, moved and inspired by this smart board technology.

Wall's study (2005) and the **BECTA report (2003)** showed the IWBs were able to catch students' attention and motivate them. **John Schacter (1999)** studied the impact of technology on the Eighth-grade student's simulation and higher order thinking in math scores, had found that the positive effects on achievement in all major subject areas and showed increased achievement in preschool through higher education for both regular and special needs children in technology rich environments. He experienced positive attitudes of students' toward learning and improvement in self-concept when technology was used for instruction. In a report evaluating the use of IWBs in secondary school mathematics instruction, **(Miller & Glover, 2006, pg 11)** note: One of the greatest gains for IWB use is that it can prompt and sustain pupil interaction in a way that exceeds that normally following traditional board use.

S. Hennessy (2011) explored that interactive white board technology opens up opportunities for learners to generate, modify, and evaluate new ideas, through multimodal interaction along with conversation.

Robert J. Marzano (2009) discovered that that interactive whiteboards had great potential as a tool to enhance pedagogical practices in the classroom, in turn improve student achievement. Smart board technology facilitates and enables the student centered teaching approaches which create the interest among secondary school students, in teaching-learning process and offers the opportunities to become confident, skilled and knowledgeable through their lives and carriers. The students of today's world can be touched, moved and inspired by this smart board technology. In order to find out impact of smart board technologies on students' behavior, the researchers formulated following Aims of the study.

Aims of the Study

1. To study the impact of smart board technology on secondary school students learning behavior.

2. To compare the perception of impact of smart board technology on SSC, CBSE and ICSE board secondary school students in relation to Learning Behaviour.

Variables of the Study

The variables used in this research are of two types:

  1. Dependent Variables

- Smart board technology

- Learning Behaviour

  2. Independent Variables

- Secondary School Students

- SSC, ICSE, CBSE Boards

Definitions of Variables:

Comparative Study: A study measured or judged by comparison.(By Oxford Dictionary)

Smart Board Technology: The Smart Board interactive whiteboard is the technology to detect and respond to touch interactions on the interactive whiteboard surface. This camera-based touch technology for interactive whiteboards and interactive displays uses digital cameras and proprietary software and firmware to detect finger or pen contact with the screen.

Secondary school students: Secondary school student are the students typically between the ages of 11-16 that is they take the education which is between primary school and high schools.

Learning behavior: Actions or conduct towards the act of acquiring new, or modifying and reinforcing, existing knowledge, behaviours, skills, values, or preferences in education.

Objectives of the Study

1. To study the impact of smart board technology on secondary school students learning behavior.

2. To compare the impact of smart board technology on secondary school students learning behaviour in relation to studying the perceptions of students of
   a. STD VII
   b. STD VIII
   c. STD IX

3. To compare the perception of impact of smart board technology on SSC, CBSE and ICSE board secondary school students in relation to their Learning Behaviour.

4. To suggest the measures of optimum utilization of smart board technological resources to achieve the aims and objectives of education.

Hypothesis of the Study

1. There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD VII of

    a. SSC Board

    b. ICSE Board

    c. CBSE Board

2. There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD VIII of

    a. SSC Board

    b. ICSE Board

    c. CBSE Board

3. There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD IX of

    a. SSC Board

    b. ICSE Board

    c. CBSE Board

Scope and Limitations of the Study

1. This study covers the impact of smart board technology on secondary school students learning behaviour, attitude and achievement of Western Suburbs of Mumbai District.

2. The study includes collection of data from SSC, ICSE and CBSE board schools.

3. The study is carried out in Western Suburbs Of Mumbai District only.

4. The study includes only English medium schools.

5. The data collected is from the secondary school students of STD VII, VIII and IX of SSC, ICSE and CBSE boards.

Delimitations of the Study

1. The study does not include any other city, other than Western suburbs of Mumbai District.

2. The study does not include vernacular medium school students.

3. The study does not include V, VI, X standards of secondary schools.

The study does not include any other boards than SSC, ICSE and CBSE.

Significance of the Study

This study will help in understanding the perceptions of secondary school students towards learning from use of smart board technology in the classroom. It will help in estimating and judging secondary school students interest and enthusiasm towards learning. This study will assist in suggesting the measures of optimum utilization of smart board technological resources to achieve the aims and objectives of education. The outcome of this study will provide evidences for the educationists, administrators and policy makers in framing the new education policies for integrating the ICT in educational processes at all level of education.

Research Design: The researchers have used the descriptive survey method. The population for the present study are the students of the secondary schools of STD VII,VIII, IX of SSC, ICSE & CBSE boards of western suburbs of Mumbai district. This study has a sample size of 100 students each from STD VII, VIII, IX of the SSC, ICSE & CBSE board schools of Western Suburbs of Mumbai District. The systematic stratified random sampling technique has been used for the selection of the schools and the assignment of the groups was randomized. The researchers have collected data from the students of secondary schools of STD VII, VIII, IX of SSC, CBSE & ICSE boards of western suburbs of Mumbai district. The nature and composition of the sample is shown below in table 3.1.

Table No. 3.1 Nature and Composition of Sample

Boards	Number Of Sample(Students)			Total Sample
	Std VII	Std VIII	Std IX	
SSC	100	100	100	300
ICSE	100	100	100	300
CBSE	100	100	100	300
Total sample	300	300	300	900

As no tool was available for the comparative study of impact of smart board technology on learning behaviour among secondary school students of Western Suburbs of Mumbai District, the researchers have developed the tool by standardizing it. The tool was prepared in accordance to the objectives of the study. In order to validate the tool, the tool was given to experts for its accuracy. There suggestions were incorporated. Then pre pilot study was done by calculating the discriminating index of each item of the tool. The reliability statistics were calculated for the same. The average inter-correlation of a seventy two item scale, the Cronbach's alpha calculated was 0.925.

Data Collection: The data has been collected from students of STD VII, VIII and IX for the comparative study of impact of smart board technology on learning behaviour among secondary school students of Western Suburbs of Mumbai District, under different boards i.e. SSC, ICSE and CBSE.

Data Analysis: The methods of analysis used for the present study were as follows:

- Descriptive Analysis
- Inferential Analysis

Descriptive Analysis of Impact of Smart Board Technology on Learning Behaviour of Students of STD VII of SSC, ICSE and CBSE Boards

Table No.1

Measures of Central Tendency and Variability of Impact of Smart Board Technology on Learning Behavior of Students of STD VII of SSC, ICSE and CBSE Boards

BOARD	SSC	ICSE	CBSC
N	100	100	100
MEAN	77.43	74.16	81.94
MEDIAN	77.5	75	83
MODE	81	77	83
S.D.	6.75	8.63	5.42
SKEW	0.17	-0.26	-0.85
KURT	-0.24	0.21	1.01

Table No. 1describes descriptive statistics of impact of smart board technology on learning behavior of students of STD VII of SSC, ICSE and CBSE boards

Figure 1

Comparative Analysis of Impact of Smart Board Technology on Learning Behavior of Students of STD VII of SSC, ICSE and CBSE Boards

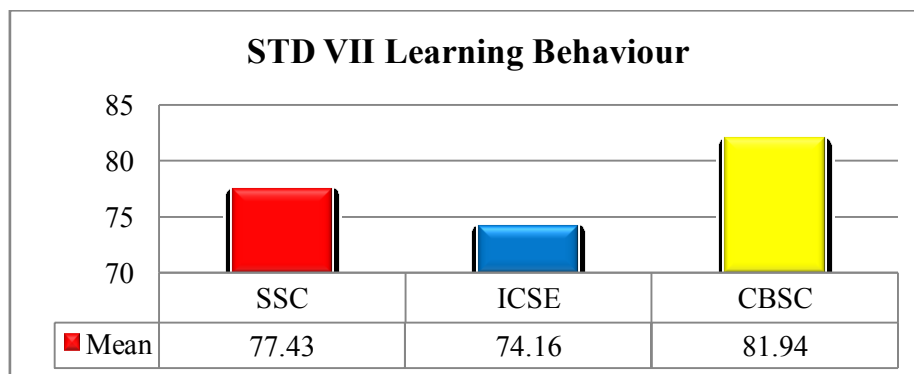| STD VII Learning Behaviour	SSC	ICSE	CBSC
Mean	77.43	74.16	81.94

Figure No. 1 clearly indicates that the Mean scores of impact of smart board technology on learning behavior of students of STD VII of SSC, ICSE and CBSE boards are the highest for the CBSE board followed by the SSC and the ICSE board.

1. Mean score of impact of smart board technology on learning behavior of students of STD VII CBSE board is more than that of STD VII SSC board.

2. Mean score of impact of smart board technology on learning behavior of students of STD VII CBSE board is more than that of STD VII ICSE board.

3. Mean score of impact of smart board technology on learning behavior of students of STD VII SSC board is more than that of STD VII ICSE board.

Descriptive Analysis of Impact of Smart Board Technology on Learning Behaviour of Students of STD VIII Of SSC, ICSE And CBSE Boards

Table No.2 Measures Of Central Tendency And Variability Of Impact Of Smart Board Technology On Learning Behaviour Of Students Of STD VIII Of SSC,ICSE And CBSE Boards

BOARD	SSC	ICSE	CBSC
N	100	100	100
MEAN	71.57	70.88	76.38
MEDIAN	73	69	77
MODE	62	69	80
S.D.	8.24	9.64	7.25
SKEW	-0.26	-0.19	-0.42
KURT	-0.78	-0.14	-0.25

Table No.4.3.B.1 describes descriptive statistics of impact of smart board technology on learning behaviour of students of STD VIII of SSC, ICSE and CBSE boards.

Figure No.2 Comparative Analysis of Impact of Smart Board Technology on Learning Behaviour of Students of STD VIII of SSC, ICSE and CBSE Boards
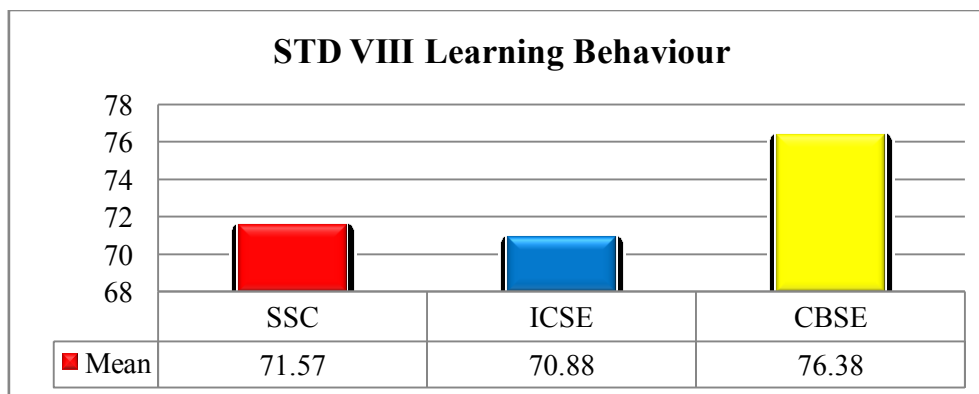
Figure 2 clearly indicates that the Mean scores of impact of smart board technology on learning behaviour of students of STD VIII of are the highest for the CBSE board followed by the SSC and the ICSE board.

- Mean score of impact of smart board technology on learning behaviour of students of STD VIII CBSE board is more than that of STD VIII SSC board.

- Mean score of impact of smart board technology on learning behaviour of students of STD VIII CBSE board is more than that of STD VIII ICSE board.

- Mean score of impact of smart board technology on learning behaviour of students of STD VIII SSC board is more than that of STD VIII ICSE board.

Descriptive Analysis of Impact of Smart Board Technology on Learning Behaviour of Students of STD IX of SSC, ICSE and CBSE Boards

Table No. 3 Measures of Central Tendency and Variability of Impact of Smart Board Technology on Learning Behaviour of Students of STD IX of SSC, ICSE and CBSE Boards

BOARD	SSC	ICSE	CBSE
N	100	100	100
MEAN	78.15	74.61	75.97
MEDIAN	80	77	77
MODE	86	77	80
S.D.	8.164193	7.71185	7.726976
SKEW	-0.78	-0.99813	-0.27639
KURT	-0.06967	0.889601	-0.52468

Table 3 describes descriptive statistics of impact of smart board technology on learning behaviour of students of STD IX of SSC, ICSE and CBSE boards

Figure No.3 Comparative Analysis of Impact of Smart Board Technology on Learning Behaviour of Students of STD IX of SSC, ICSE and CBSE Boards

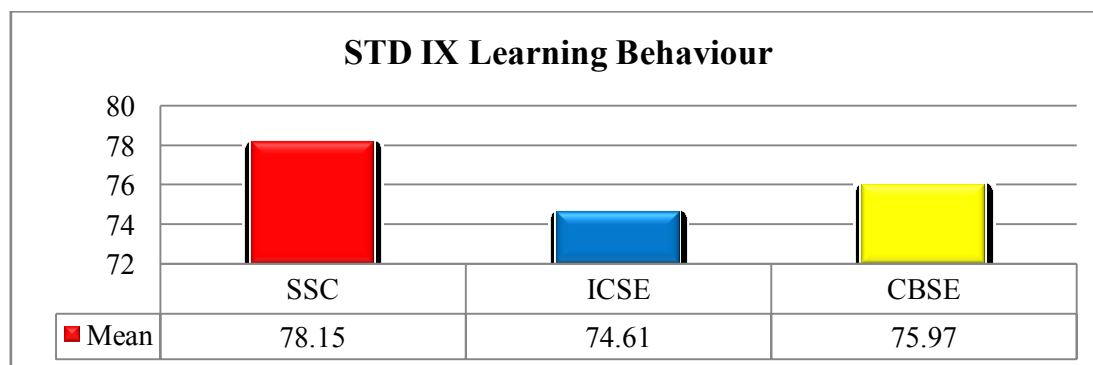|	SSC	ICSE	CBSE
Mean	78.15	74.61	75.97

Figure No.3 clearly indicates that the Mean scores of impact of smart board technology on learning behaviour of students of STD IX of SSC, ICSE and CBSE boards are the highest for the SSC board followed by the CBSE and the ICSE board.

- Mean score of impact of smart board technology on learning behaviour of students of STD IX SSC board is more than that of STD IX CBSE board.

- Mean score of impact of smart board technology on learning behaviour of students of STD IX SSC board is more than that of STD IX ICSE board.

- Mean score of impact of smart board technology on learning behaviour of students of STD IX CBSE board is more than that of STD IX ICSE board.

Testing of Hypothesis 1

There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD VII of

    d. SSC Board

    e. ICSE Board

    f. CBSE Board

Technique Used: ANOVA

Variable: Learning Behaviour

Group: SSC, ICSE and CBSE Boards

Table No. 4.6.1.A Analysis of Variance of Impact of Smart Board Technology on Learning Behaviour of Secondary School Students of STD VII of SSC, ICSE and CBSE Boards

Source Of Variation	SS	Df	MS	F	F crit	Level Of Significance
Between Groups	3052.047	2	1526.02	30.65		Significant
Within Groups	14789.59	297	49.80		3.03	At 0.05 Level
Total	17841.64	299				

Table No. 4.6.1.A describes the analysis of variance of mean scores between and within groups of impact of smart board technology on learning behaviour of secondary school students of STD VII of SSC, ICSE and CBSE boards.

The critical/table value of F at 0.05 level of significance for df1=2 and df2 = 297, is 3.03. The obtained value of F is 30.65, which is significantly high than table value. Hence the null hypothesis is rejected.

There is a significant difference in the impact of smart board technology on secondary school students learning behaviour of STD VII of SSC, ICSE and CBSE Boards.

Since F value is found to be significant, each pair of means is then subjected to t-test to determine which pair of means is significantly different.

Testing of Hypothesis 2

There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD VIII of

     a. SSC Board

     b. ICSE Board

     c. CBSE Board

Technique Used: ANOVA

Variable: Learning Behaviour

Group: SSC, ICSE and CBSE Boards

Table No. 4.6.1.B Analysis of Variance of Impact of Smart Board Technology on Learning Behaviour of Secondary School Students of STD VIII of SSC, ICSE and CBSE Boards

Source Of Variation	SS	Df	MS	F	F crit	Level Of Significance
Between Groups	1795.41	2	897.70	12.62	3.03	
Within Groups	21130.63	297	71.15			Significant At 0.05 Level
Total	22926.04	299				

Table No.4.6.1.B describes the analysis of variance of mean scores between and within groups of impact of smart board technology on learning behaviour of secondary school students of VIII standard of SSC, ICSE and CBSE boards.

The critical/table value of F for df1=2 and df2 = 297, at 0.05 level of significance is3.03. The obtained value of F is 12.62, which is significantly high than table value. Hence the null hypothesis is rejected.

There is a significant difference in the impact of smart board technology on secondary school students learning behaviour of STD VIII of SSC, ICSE and CBSE Boards.

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Since F value is found to be significant, each pair of means is then subjected to t-test to determine which pair of means is significantly different.

Testing of Hypothesis 3

There is no significant difference in the impact of smart board technology on learning behaviour of secondary school students in relation to studying the perceptions of students of STD IX of

a. SSC Board

b. ICSE Board

c. CBSE Board

Technique Used: ANOVA

Variable: Learning Behaviour

Group: SSC, ICSE and CBSE boards

Table No. 4.6.1.C Analysis of Variance of Impact of Smart Board Technology on Learning Behaviour of Secondary School Students of STD IX of SSC, ICSE and CBSE Boards

Source Of Variation	SS	Df	MS	F	F crit	Level Of Significance
Between Groups	637.79	2	318.89	5.15	3.03	Significant At 0.05 Level
Within Groups	18397.45	297	61.94			
Total	19035.24	299				

Table No. 4.6.1.C describes the analysis of variance of mean scores between and within groups of impact of smart board technology on learning behaviour of secondary school students of STD IX of SSC, ICSE and CBSE boards.

The critical/table value of F for df1=2 and df2 = 297, at 0.05 level of significance is3.03. The obtained value of F is 5.15, which is significantly higher than table value. Hence the null hypothesis is rejected.

There is a significant difference in the impact of smart board technology on secondary school students learning behaviour of STD IX of SSC, ICSE and CBSE Boards.

Since F value is found to be significant, each pair of means is then subjected to t-test to determine which pair of means is significantly different.

Findings of the study:

1. The mean score of STD VII of SSC board was found significantly more than that of ICSE board, it was concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VII of SSC board is better than that of ICSE board.

2. The mean score of STD VII of SSC board was found significantly more than that of CBSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VII of SSC board is better than that of CBSE board.

3. The mean scores of STD VII of CBSE board was found significantly more than that of ICSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VII of CBSE board is better than that of ICSE board.

4. The mean scores of STD VIII of SSC board was found significantly more than that of ICSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VIII of SSC board is better than that of ICSE board.

5. The mean score of STD VIII of SSC board was found significantly more than that of CBSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VIII of SSC board is better than that of CBSE board.

6. The mean scores of STD VIII of CBSE board is significantly more than that of ICSE SE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD VIII of CBSE board is better than that of ICSE board.

7. The mean score of STD IX SSC board is significantly more than that of ICSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD IX of SSC board is better than that of ICSE board.

8. The mean score of STD IX of SSC board is significantly more than that of CBSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD IX of SSC board is better than that of CBSE board.

9. The mean score of STD IX of CBSE board is significantly more than that of ICSE board, it can be concluded that the impact of smart board technology on learning behaviour of secondary school students of STD IX of CBSE board is better than that of ICSE board.

Suggestions and Recommendations for the Teachers:

1. New and innovative methods of teaching by using smart board technology should be included to make teaching learning more interesting.

2. Training should be imparted for better implementation of smart board technology.

3. Maximum utilization of smart board technology should be done for secondary section.

4. Different activities should be promoted to develop positive attitude of students towards smart board technology, for developing better learning achievements among students.

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