

Effectiveness of Interactive White Board in Relation to Academic Achievement of Elementary School Students

Abstract

Smart Technology has become the basic requirement of the present education system. For effective teaching, schools have started using smart board technology. The smart technology Interactive White Board (IWB) is being used in the teaching learning process. There is another technique of teaching called as traditional i.e. lecture in which the student learn through hearing. In the present study, experimental method was used to determine the effectiveness of both the methods as well as to find out the most suitable technique for the present generation. For this 7th grade students from Satluj Public School Sirsa were selected. Achievement test was developed by the investigators and t-test was used to analyze the data. The obtained results reveal that smart learning positively affects the achievement of students in social science.

Keywords: Interactive White Board, Academic Achievement, Smart Technology.

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Introduction

Now a day's Technology has affected the every aspect of life. This paper discusses the IWB class room instruction as a modernized method of education in Indian education scenario which provides quality education to students by helping them in better concept formation, exploration, improvement in reading and writing skills and academic achievements. IWB classroom teaching benefitted us in every aspect of teaching and learning environment. In ancient days students were taught by the Gurus by oral method of instruction in Gurukul. Now new innovation takes place with new method of teaching in classroom such as use of IWB while teaching. By the use of new technology, teachers make an interesting, attentive instruction material with the use of animated 3D Modules, using Videos, Clip Art, Images in broad sense. The concept of IWB classroom learning environment has not only made interesting education but also give chance to students to improve their performance.

Kumari and Rani (2015) reviewed the literature concerning the introduction of Interactive White Boards (IWBs) in educational settings. A number of themes were identified in the literature about the potential benefits of IWBs for teaching. These were flexibility and versatility, multi model presentation, interactive and participation in lessons. Finding reveals that Interactive whiteboard is a flexible and versatile teaching tool across age group and setting (example Austin 2003, Jamerson 2002). Smith (2001) reports on the benefits of using a graphics package to support younger pupil's hand writing on paper. Similarly, younger pupils in Goodison's study (2002) reported a preference for using the IWBs as opposed to computer because they found the keyboard and mouse difficult to manipulate. In Mathematics, Edwards *et al.* (2002) found that real-time movement such as rotation alongside visual cues such as highlighting supposed supported the teaching of fractions, measurement of angles and variety of transformations. Review of literature reflected that planning time should eventually be reduced given the facility of IWBs technology to save, share and reuse lesson materials (example Lee & Boyle 2003). Secondary School teachers interviewed by Glover and Miller (2001) saw the ability to save materials on an IWB as 'a means of teaching development based on reflections not just from lesson to lesson but also year to year'. Certainly same secondary schools are sharing resources prepared on and for IWB lessons across the school via the school network or internet (Boyle 2002; Levy 2002) study reported that sharing their work with others in class helped them to articulate their ideas and give explanations. They also enjoyed the opportunity to see and discuss other pupil's work. Brich (2003),

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Glover and Miller (2001) and Walker (2003) all reported that pupils were good at listening to each other and are supportive and encouraging when a class member is at the board. Above studies has revealed a clear preference for IWB use by other teacher and pupils.

Parkash J (2013) conducted an experimental study in Jalander district of Punjab. The sample of study was taken from Royal convent secondary school by using random sampling technique. For data collection, investigator used self developed standardized achievement test as a tool and t-test used for analysis, interpretation of the same. He investigated the effect of smart class room learning environment on academic achievement of rural high achiever and low achiever students in science and found significant difference between high achievers and low achievers. The results show that the students who were taught through traditional method were low achiever in science on comparison to smart class learning environment. The reasons of performing well by students taught through smart class may be due to smart class learning helped to develop cognitive dimension and reinforcement given to all students on every improvement.

Bano, N. (2016) conducted a study on a sample of 30 students of first grade Govt. High school Bakshipora and found that smart classroom environment positively affects the performance of first grade students in mathematics. It was also suggested that this strategy helps the learner to move at his own pace as it helps the learner to provide individual attention. Teacher can use both small group and whole class approaches to teaching mathematics.

Rationale of the Study

Many years ago, the premise of going up to the front of the classroom to write on the blackboard was enough to get students to pay attention. This generation of students expects more. They watch their favorite television shows in high-definition, they get answers to their questions in a split second on an internet search engine. School and educators around the world have started to harness high-tech teaching tools to bridge the digital divide and make sure students are engaged and excited about what they are learning in the classroom.

One of the most popular high-tech teachings tools available to schools is the Interactive White Board. An interactive white board can be electromagnetic or touch-sensitive board that allows teachers to conduct interactive lesson from any resources on their computer. Using an interactive pen or their finger, teachers can control how the lesson is

displayed on the screen and add notes, images and even audio-video files to make it more engaging for today's students. On the basis of review of literature, it was found that research has been conducted in the field of IWB in various science subjects like Physics, Chemistry and Mathematics and Languages but there is a dearth of research in the field of Social Science. Keeping all this in view the present study has been designed.

Objectives of the Study

1. To develop Interactive Whiteboard instructional material for elementary school students.
2. To study the interactional effect of instruction through Interactive Whiteboard on academic achievement of students with respect to levels of intelligence.

Hypotheses

1. There is no significant interactional effect between the mean of pre-test, post-test, achievement scores of students in social science of high intelligent students taught through Interactive Whiteboard and traditional method.
2. There is no significant interactional effect between the mean of pre-test, post-test, achievement scores in social science of average intelligent students taught through Interactive Whiteboard and traditional method.
3. There is no significant interactional effect between the mean of pre-test, post-test, achievement scores in social science of low intelligent students taught through Interactive Whiteboard and traditional method.

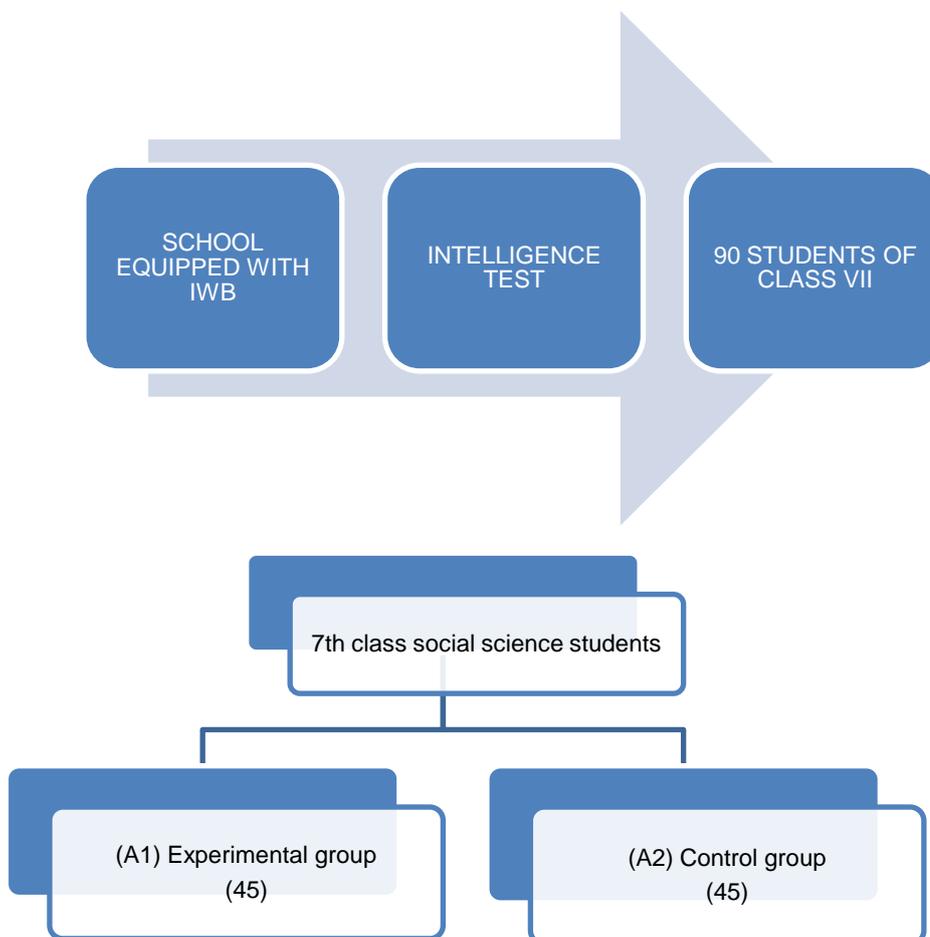
Design of the Study

The experimental design resembled three-way factorial (2x3x2) nested-cum-crossing design. Here, two treatments involved were IWB learning material; three levels of intelligence, i.e. high, average, low; and two occasions of testing were pre-test and post-test, for the dependent variable of academic achievement.

Population

For experimentation, a sample of ninety students of 7th class was selected from Satluj Public school of Sirsa, having IWB facility. Raven's Standard Progressive Matrices was administrated on these students and their scores on intelligence test were computed out. Then these students were divided into three level namely high intelligence, average intelligence and low intelligence levels and each group consists of thirty students. These three intelligence levels were made in order to match the experimental group and control group.

Sample of the Study



Tools Used

In the present study, two types of tools were used. These were:

1. Instructional tools and
2. Measuring tools

Instructional Tools

Instructional tools are those which are used to impart instructions to the students. In the present study researchers developed these tools. Interactive White Board learning material and traditional learning material were used as an instructional tools. The instructional tool includes one topic of social science i.e. The Delhi Sultans for both groups of 7th class students.

Measuring Tools

Measuring tools were employed to measure change in the behavior of the students.

1. Raven's standard progressive Matrices of intelligence were used to measure pupil's intelligence (1989).
2. Academic achievement test developed by the investigators was used to measure the achievement of students in social science.

Experimentation

After the selection of the sample and allocation of students of class 7th in two groups for instructional strategies the experiment was conducted in two phases. The group of the students learning

through IWBLM was named as A1. Another group which was taught through traditional method of instruction was named as A2. The topic of social science for both the group was same.

Data Collection

On the basis of objectives of the study, the data concerning academic achievement was collected on two occasions:

Occasion 1

The first occasion was the pre-test stage. This was the occasion before interaction with IWBLM and traditional method. At this stage, the students before the treatment, groups were administered with achievement test on the above mentioned topic. The scores on this occasion was termed as pre test scores.

Occasion 2

Immediately after the treatment the students were administered with achievement test. The score on this occasion was termed as post test scores.

Statistical Analysis of the Data

1. Descriptive statistics such as measures of mean and standard deviation were used to study the nature of data.
2. 't' ratios were computed to find out the significance of difference between mean of pre-test scores and post test scores.

Effect of Interactive White Board Learning Materials (IWBLM) on Achievement Scores of Students

(Topic: The Delhi Sultans)

Main Effects

The calculated average of the scores, for all the criterion variable is known as the main effect of treatment. To measure the effect of IWBLM on achievement regarding topic- 1, (The Delhi Sultans) Means S.Ds, and t-test are applied. There are three

Table: 1.1 (Topic-The Delhi Sultans)

Means, S.Ds and t-value showing differences between the different instructional strategies.

Groups	Mean	S.D	t-value	Level of significance
IWBLM (A1) (N=45)	13.70	5.31	4.59	0.05
Traditional (A2) (N=45)	9.11	4.12		

In table 1.1 the obtained t- ratio (4.59) is significant at 0.05 level of significance. The obtained findings show significant difference between two comparable groups (A1 and A2) i.e experimental group (A1) and control group (A2). The experimental group taught through IWBLM strategy obtained high mean scores on the topic, The Delhi Sultans, than the control group taught through traditional method. It clearly shows that IWBLM instructional strategy of teaching is more effective than the traditional method.

Main Effect of Levels of Intelligence

The main effect of intelligence was analyzed at three levels of intelligence i.e. high intelligence level, average intelligence level and low intelligence level.

Table: 1.2 (Topic-The Delhi Sultans)

Means, S.Ds and t-value showing differences between the levels of intelligence (High Intelligence Level- B1 and Average Intelligence Level-B2)

Groups	Mean	S.D.	t-value	Level of significance
(High Intelligence Level- B1) (N=30)	20.50	1.70	5.71	0.05
(Average Intelligence Level-B2) (N=30)	17.42	2.42		

The obtained t-value (5.71) is significant at 0.05 level of significance. The obtained findings show significant differences between two comparable groups (B1 and B2) i.e. high intelligence level (B1) and average intelligence level (B2).The obtained mean scores of highly intelligent students is higher (20.50) than the average intelligent students (17.42) as shown in the table 1.2. It clearly shows that highly intelligent students learn more easily and effectively than average intelligent students.

independent variables i.e. instructional strategies of teaching (A1 and A2), levels of intelligence (B1, B2 and B3) and testing occasions (C1 and C2). The effect is observed on the dependent variables and results of the interaction presented separately.

Main effect of instructional strategies of teaching (IWBLM- A1 and Traditional method- A2)

The main effect of IWBLM instructional strategy and traditional method was analyzed and presented in table 1.1 given below:

Table: 1.3 (Topic-The Delhi Sultans)
Means S.Ds and t-value showing differences between the high and low level of intelligence (High Intelligence Level- B1 and Low Intelligence Level-B3)

Groups	Mean	S.D.	t-value	Level of significance
(High Intelligence Level- B1) (N=30)	20.50	2.10	12.39	0.05
(Low Intelligence Level-B3) (N=30)	15.12	1.12		

The obtained t-value (12.39) is significant at 0.05 level of significance. The obtained findings show significant difference between two comparable groups (B1 and B3) i.e. high intelligence level (B1) and low intelligence level (B3).The obtained mean scores of highly intelligent students is higher (20.50) than the low intelligent students (15.12) as shown in the table 1.3. It clearly indicated that highly intelligent students are more capable to learn, easily and effectively than low intelligent students.

Table: 1.4 (Topic-The Delhi Sultans)
Means S.Ds and t-value showing differences between the average and low level of intelligence (Average Intelligence Level- B2 and Low Intelligence Level-B3)

Groups	Mean	S.D.	t-value	Level of significance
(Average Intelligence Level- B2) (N=30)	17.42	2.42	4.73	0.05
(Low Intelligence Level-B3) (N=30)	15.12	1.12		

The obtained t-value (4.73) is significant at 0.05 level of significance. The obtained findings show significant difference between two comparable groups (B2 and B3) i.e. average intelligence level (B2) and low intelligence level (B3).The obtained mean scores of average intelligent students is higher (17.42)

Remarking An Analisation

than the low intelligent students (15.12) as shown in the table 1.4 . It clearly reveals that average intelligent students learn more easily and effectively than low intelligent students.

Main Effect of Testing Occasions

The main effect of testing occasions (pre-test and post-test) was analyzed and presented in Table 1.5 given below

Table: 1.5 (Topic-The Delhi Sultans)

Means, S.Ds and t-value showing difference between the testing occasions (Pre-Test-C1 and Post-Test-C2)

Groups	Mean	S.D.	t-value	Level of significance
Pre-Test (C1) (N=90)	10.51	2.80	10.85	0.05
Post-Test (C2) (N=90)	16.20	4.12		

The obtained t-value (10.85) is significant at 0.05 level of significance. The obtained findings show significant difference between two comparable groups (C1 and C2) i.e. pre testing occasion (C1) and post testing occasion(C2).The obtained mean scores of post- test group is higher (16.20) than the pre test group (10.51) as shown in the table 1.5. Thus, it reveals that after the experiment, achievement scores have been improved.

Double Interactional Effect (2x2) Between Instructional Strategies (A1 And A2) And Intelligence Levels (B1, B2 And B3) On Achievement Scores

The analysis of above mention combination is presented in table 1.6 given below

Table: 1.6

Means and S.Ds showing double interactional effect between instructional strategies x intelligence levels (AxB) (N=15)

Groups	Mean	S. D.
A1B1	21.10	1.40
A1B2	19.36	1.90
A1B3	15.32	2.34
A2B1	17.50	2.11
A2B2	15.0	2.80
A2B3	11.40	2.61

The obtained findings show significant double interactional effect between instructional strategies (A1 & A2) and levels of intelligence (B1, B2 & B3). The obtained mean scores of experimental group that taught through IWBLM, shows higher achievement scores than the mean score of control group that taught through traditional method. It clearly indicates that IWBLM instructional strategy of teaching is more effective than the traditional method.

Double interactional effect (2x2) between the instructional strategies (A1 and A2) and testing occasions (C1 and C2)

The analysis of above mention combination is presented in table 1.7 given below

Table: 1.7

Means and S.Ds showing double interactional effect between instructional strategies x testing occasions (AxC)

(N=45)

Groups	Mean	S. D.
A1C1	10.12	2.80
A1C2	17.41	3.12
A2C1	10.61	2.90
A2C2	15.12	4.51

The obtained results show significant double interactional effect between instructional strategies (A1 & A2) and testing occasions (C1 & C2). The obtained mean scores of experimental group that taught through IWBLM, shows higher mean scores in post test than the post mean scores of control group that taught through traditional method in table 1.7. It clearly shows that IWBLM instructional strategy of teaching is more effective than the traditional method.

Double interactional effect (2 x 2) between levels of intelligence (B1, B2 and B3) and testing occasions (C1 and C2)

The analysis of above mention combination is presented in table 1.8 given below

Table: 1.8

Means and S.Ds showing Double interactional effect between levels of intelligence and testing occasions (B x C) (N=30)

Groups	Mean	S. D.
B1C1	12.12	1.60
B1C2	19.51	1.71
B2C1	10.10	1.51
B2C2	17.09	2.10
B3C1	7.51	1.68
B3C2	11.01	2.91

The obtained findings show that the high level intelligence group is higher achiever on the post test (19.51) than the average level intelligence group (17.09) and low level intelligence group (11.01) on post test. Thus, it reflects that after the treatment, achievement scores have been improved.

Triple interactional effect of instructional strategies (A1 and A2), levels of intelligence (B1,B2 and B3) and testing occasion (C1 and C2) on achievement

The analysis of triple interactional effect is presented in table 1.9 given below

Table:1.9

Means and S.Ds for the triple interactional effect of instructional strategies, levels of intelligence and testing occasions (AxBxC) (N=15)

Groups	Mean	S.D.
A1B1C1	12.12	1.50
A1B1C2	20.10	2.12
A1B2C1	10.10	1.51
A1B2C2	18.10	1.91
A1B3C1	7.50	1.61
A1B3C2	13.90	1.91
A2B1C1	13.10	1.82
A2B1C2	18.90	1.91

A2B2C1	11.01	1.40
A2B2C2	16.21	1.90
A2B3C1	6.80	1.80
A2B3C2	10.01	2.51

Table 1.9 shows that students with high level of intelligence are the highest achiever on the post test (20.10) when taught through IWBLM and the students taught through traditional method with high level of intelligence are the low achievers (18.80) on post test. It clearly shows that IWBLM instructional strategy of teaching is more effective than the traditional method.

Conclusion

On the basis of the analysis, Interpretation of data and discussion of results, this study shows that the mean post test achievement scores of experimental group and that of control group differ significantly in favour of the experimental group than that of pre-test scores. This implies that students, taught through IWBLM instructions, scored higher on the achievement test in social science than the students who received instruction through tradition method. It suggests that IWBLM based instruction method is effective for teaching and also raising the achievement of students in social science.

Findings of the Study

The present study has generated some interesting findings concerning the benefit of using interactive white board in teaching a social science topic as compared to the traditional method of teaching. Results indicated that interactive white board used method of teaching significantly improved students performance on the achievement test.

1. The obtained findings show that the mean post-test achievement scores of experimental group and that of control group differ significantly in favour of the experimental group than that of pretest scores. This implies that, students taught through IWB class instructions, scored significantly higher mean on the achievement test in Social Science than the students who received instructions through traditional method of instruction. It suggests that Interactive whiteboard learning material based instruction, contributes towards raising the achievements of students in social science.
2. The main effect of instructional strategies of teaching shows significant difference between two comparable groups. The experimental group obtained high mean scores than the control group. It suggests that IWBLM instructional strategy of teaching is more effective than the traditional method.
3. The obtained findings show significant difference between two comparable groups (A1 and A2) i.e. experimental (A1) and control group (A2). The experimental group taught through IWBLM strategy obtained high mean scores than the control group taught through traditional method. It clearly shows that IWBLM instructional strategy of teaching is more effective than the traditional method.

4. The obtained findings show significant difference between two comparable groups (B1 and B2) i.e. high intelligence level (B1) and average intelligence level (B2). The obtained mean scores of highly intelligent students is higher than the average intelligent students. It clearly shows that highly intelligent students learn more easily and effectively than average intelligent students.
5. The obtained findings show significant difference between two comparable groups (B1 and B3) i.e. high intelligence level (B1) and low intelligence level (B3). The obtained mean scores of highly intelligent students is higher than the low intelligent students. It clearly shows that highly intelligent students are more capable to learn, easily and effectively than low intelligent students.
6. The obtained findings show significant difference between two comparable groups (B2 and B3) i.e. average intelligence level (B2) and low intelligence level (B3). The obtained mean scores of average intelligent students is higher than the low intelligent students. It clearly shows that average intelligent students learn more easily and effectively than low intelligent students.
7. The obtained findings show significant double interactional effect between instructional strategies (A1 & A2) and levels of intelligence (B1, B2 & B3). The obtained mean scores of experimental group that taught through IWBLM shows higher achievement scores than the mean score of control group that taught through traditional method. It clearly indicates that IWBLM, instructional strategy of teaching is more effective than the traditional method.
8. The triple interactional effect between instructional strategies x levels of intelligence x testing occasions (AxBxC) is significant. It shows that students with high level of intelligence were the highest achiever on the post test when taught through IWBLM and the students taught through traditional method with high level of intelligence are the low achievers on post test. It clearly shows that IWBLM instructional strategy of teaching is more effective than the traditional method.

Educational Implications

1. The present research already shown that the changing form of a traditional chalk and talk method of instruction to an interactive class instruction method has improved the achievement level of the students. It implies that IWBLM proved to be more enjoyable in its effectiveness on achievement than the traditional classroom instruction approach. Interactive class instructions are more practical and acceptable to teachers as well as to the students of all levels.
2. Interactive class instructions help the teachers to make their teaching learning process more effective. The findings of the study have their implication for teachers, teacher educators, curriculum planner as well as for the administrators.

3. IWB class instructions suggest a new role for the teachers as a facilitator. A teacher accustomed to being the sole source of information for teaching the passive learners in the classroom, has to change himself/ herself to be a facilitator. A teacher has to play an active role in the learning process of the students to participate in discussion, participation in making of IWBLM and give textual, audio, video, graphical and animation input for interactive class instruction. So, the students feel being a part of the entire teaching learning process.
4. The study has important implications in today's world of education. Given the current widespread use of Interactive whiteboard learning material of all levels and for all the subjects, it is imperative that teachers should learn this new technology. The teachers should understand how to develop and run Interactive whiteboard learning material.

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