EFFECTIVENESS OF SMART CLASSROOM TEACHING ON THE ACHIEVEMENT IN CHEMISTRY OF SECONDARY SCHOOL STUDENTS

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Abstract: This study analyzes the effectiveness of smart classroom teaching on the achievement in chemistry of secondary school students. The study investigated 320 Class IX students from Amritsar city. Achievement test in Chemistry of 50 items was used to collect the data. Experimental group was taught in smart classrooms and control group was taught by conventional mode of instruction. The results revealed that students achieved higher when taught in smart classes as compared to conventional mode of instruction. Learning styles of students did not affect their achievement in experimental and control group. No interaction effect of instructional strategies and learning style was found.

Keywords: Smart classroom teaching, Achievement

I. INTRODUCTION

At present the role of the teachers in educating the children has gained paramount importance. On one side the classrooms are overcrowded with overloaded syllabi where the pupils are expected to gain knowledge and on other side the role of teachers has become significant to develop interest and meaningful understanding amongst the students. An alternative process or method of teaching has to be adopted, in this fast developing world, where knowledge explosion has been taking place every day in every sphere of life. It is unreasonable to expect that spoken or written words alone to convey the volume of relevant information to the learner. The selection of teaching method and techniques depends upon the nature of the test, learning objectives on one side and entering behaviour of the students on the other side.

Information and Communication Technology is an important instrument, which can transfer the present isolated teacher and book centred learning environment into a rich learning environment. Blurton (1999) stated that “ICT” stands for Information and Communication Technologies “a diverse set of technological tools and resources used to communicate, to create, to disseminate, to store and to manage information.” To make teaching-learning environment richer and more effective, teachers through power point presentations deliver their lessons. This involves a detailed and complex preparation on the part of the teacher. The typical classroom was once characterized by students sitting through hour long teaching monologues. Now, technology is making life easier for both educators and students. New method of teaching has been introduced which is publically known as Smart Class. Smart Class is a revolutionary classroom technology leveraged teaching-learning system that is transforming the way teachers teach and the students learn in schools. It makes use of mapped curriculum 2D and 3D digital content which the teacher could access right in the classroom and project it on whiteboard, to elucidate and explain critical concepts, across virtually all subjects. (What learning can be? 2012).

We can still remember the days when learning used to be monotonous with a teacher teaching using the boring chalk-board. Who knows learning could be fun and entertaining with the changes in the teaching system. With the advent of the Smart Class learning has become more enjoyable in class. In simple terms, an innovative and meaningful use of technology in the way of teaching has enriched learning because it engages the students and the teachers and creates a connection between them by making the class active. Everyone likes to watch videos and movies, especially the kids. Students are shown video clips related to undertaken concept with the help of the technology in digital classrooms, the teaching sessions can also be recorded for further use by uploading the recorded documents in the web. Use of Smart board makes the teaching easy for the teachers and learning the concept easy for the students. Students become more interactive and volunteering in the classes. In a smart classroom enabled schools, the classrooms are connected to what is known as the knowledge centre where all the digital contents are linked to the server. Teachers can access the lessons they want to teach during their teaching periods, they can use it to demonstrate; take learners through an audio-visual journey and above all help them to learn better. Schools are
increasingly adopting digital teaching solutions to engage with a generation of pupils well-versed with the Play stations and I Pads, and trying to make the classroom environment more inclusive and participatory.

II. FEATURES OF SMART CLASS

- Smart classes help teachers to meet new challenges and developing students’ abilities and performance.
- Smart classroom enables teachers to access multimedia content and information that can be used for teaching students more effectively.
- Smart class enables teachers to express their views and ensures that every child is understanding the undertaken concept which ultimately affects his achievement.
- Achievement is possible only if concepts are clearly understood. It is possible though Smart class where all domains of knowledge are affected.
- A well designed module of smart class allows a student to visualize the concept much better than static images.
- Smart class teaching is a step towards development where students’ achievement is highlighted.
- Makes learning an enjoyable experience for students.

III. SIGNIFICANCE OF THE PROBLEM

The traditional approach of lecture and note taking has lost its effectiveness as the modern day around education grows. In efforts to grow academically it must be considered that differentiated modalities of teaching and learning are necessary to implement deeper levels of growth and conceptual development. Since every student is not interested in all subject matters. However, it is the responsibility of the education system to employ a variety of opportunities for the students to gain interests, orchestrating academic growth and progression throughout childhood and adolescence. ICT has turned from being a technology of communication and information to a curriculum creation and delivery system for teachers and learners. Such a task in today’s time is tremendously being performed by Smart Class that caters K12 curriculum. Present study will help us to know the effectiveness of smart class teaching on the three domains of learners with respect to their performance, achievement, retention and learning. It would also help the policy makers to design the curriculum in such a way that it will help the teacher to teach the subject in an effective manner and maintain pace with the modern education.

IV. OBJECTIVES OF THE STUDY

1. To study the effectiveness of different Classroom teachings i.e. Smart Classroom teaching and conventional mode of teaching on achievement of class IX students in chemistry.
2. To study the academic achievement in chemistry of class IX students when taught through Smart Classroom teaching and conventional teaching with respect to gender.
3. To study the interactional effect of Smart Classroom teaching conventional teaching and gender on the achievement in chemistry of class IX students.

V. HYPOTHESES

For the present investigation the following hypotheses were formulated:

1. There will be no significant difference in the achievement of class IX students in chemistry when taught through different Classroom teachings i.e. Smart Classroom teaching and conventional mode of teaching.
2. There will be no significant difference in the achievement of class IX students in chemistry when taught through Smart Classroom teaching and conventional teaching with respect to gender.
3. There will be no significant interactional effect of Smart Classroom teaching, conventional teaching and gender on the achievement of class IX students in chemistry.

VI. RESEARCH METHOD

Research Design

In the present study, 2 X 2 factorial experimental design was employed.

Sample for the Study

Stratified Random sampling technique was employed by the investigator for the selection of the sample. In the present study sample of (N=330) students of IX grade was drawn randomly from the different schools of Amritsar city. The sample comprising of 330 students was administered two tests-test of achievement in Chemistry and test of intelligence. Out of 330 students, six students did not respond to all the items of achievement and four students did not respond to some items of intelligence test i.e. total of 10 students were dropped from the sample of 330 students. The scores of these students were not considered at the time of analysis. Hence sample comprising of 320 students were randomly divided into two groups- the experimental group and the control group. In order to make equivalent groups, matching was done at the pre-test stage for two variables- variable of achievement in Chemistry (pre-test) and intelligence. t-test was employed to compare mean scores on the variable of achievement in Chemistry and Intelligence. Insignificant t-ratio showed that both
the groups were matched and equivalent. The experimental group was taught with smart class teaching and the control group was taught with conventional mode of teaching.

Sample Distribution on the basis different classroom teachings
As the present study involved two different classroom teachings (Smart Classroom teaching and conventional mode of teaching) hence the students (N=320) were distributed at two stages-on the basis of different classroom teachings.

Stage I: Sample Distribution on the basis of different classroom teachings
The sample was distributed on the basis of different classroom teachings into two types i.e. Smart Classroom teaching (SCT) and conventional mode of teaching (CMI). The distribution of the sample on the basis of these strategies is presented in table 1.

Table 1: Showing Distribution of Sample on the basis of different classroom teachings

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Experimental Group taught with SCT</th>
<th>Control Group taught with CMI</th>
<th>Total No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>63</td>
<td>62</td>
<td>125</td>
</tr>
<tr>
<td>2.</td>
<td>49</td>
<td>49</td>
<td>98</td>
</tr>
<tr>
<td>3.</td>
<td>48</td>
<td>49</td>
<td>97</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>160</td>
<td>320</td>
</tr>
</tbody>
</table>

VII. Tools Used
In the present study the following tools were used:
1. An achievement test in Chemistry for class IX was constructed and standardized to measure the performance of students before and after the treatment.
2. General Group Test of Intelligence (GGTI) by Ahuja (2005).
3. Smart class program on some topics of Chemistry has been used by the experimenter to give treatment to the experimental group.

VIII. PROCEDURE
Conducting the Experiment
The present study was conducted in four phases:
Phase I: Development of an Achievement Test in Chemistry
Phase II (a): Matching the Groups
Phase II (b): Administration of an Achievement Test (pre-test),
Phase III: Implementation of Web Based Instructional Package
Phase IV: Administration of the Achievement Test (post-test)

IX. RESULTS AND DISCUSSION
F values were calculated to study the main effect and interaction effects of two factors viz. different classroom teachings and gender with regard to gain scores of class IX students on the variable of achievement in Chemistry. The F values calculated by using two way ANOVA test is presented in table II.

Table II: Showing computation of means and standard deviations with respect to gender and method of teaching

<table>
<thead>
<tr>
<th>DEPENDENT VARIABLES</th>
<th>METHOD</th>
<th>N</th>
<th>STANDARD DEVIATION</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOYS</td>
<td>SMART CLASS TEACHING</td>
<td>35</td>
<td>2.119</td>
<td>29.26</td>
</tr>
<tr>
<td></td>
<td>CONVENTIONAL TEACHING</td>
<td>35</td>
<td>2.157</td>
<td>22.63</td>
</tr>
<tr>
<td>GIRLS</td>
<td>SMART CLASS TEACHING</td>
<td>35</td>
<td>2.807</td>
<td>29.94</td>
</tr>
<tr>
<td></td>
<td>CONVENTIONAL TEACHING</td>
<td>35</td>
<td>1.833</td>
<td>22.86</td>
</tr>
<tr>
<td>TOTAL</td>
<td>SMART CLASS TEACHING</td>
<td>35</td>
<td>2.493</td>
<td>29.60</td>
</tr>
<tr>
<td></td>
<td>CONVENTIONAL TEACHING</td>
<td>35</td>
<td>1.990</td>
<td>22.74</td>
</tr>
</tbody>
</table>

Table II clearly reveals that:
Mean score of academic achievement in chemistry of boys when taught through smart class is 29.26 with standard deviation 2.119 and mean score of academic achievement in chemistry of girls is 29.94 with standard deviation 2.807.

Mean scores of academic achievement in chemistry of boys when taught through conventional method is 22.63 with S.D. of 2.157 and mean score of academic achievement in chemistry of girls is 22.86 with S.D. 1.833. It means that girls when taught through conventional method as against boys show greater academic achievement.

Mean scores of academic achievement in chemistry of boys when taught through smart class is 29.26 with S.D of 2.119 and conventional method is 22.63 with S.D. of 2.157. It means that boys when taught through smart class approach have high mean scores as compared against conventional method.

Mean scores of group when taught through smart class is 29.60 with S.D 2.493 and conventional teaching is 22.74 and S.D 1.990. It means that group when taught through smart class approach has greater mean sc

\[ \text{Mean score of group when taught through smart class is } 29.26 \text{ with S.D 2.119 and conventional method is } 22.63 \text{ with S.D 2.157. It means that boys when taught through smart class approach have high mean scores as compared against conventional method.} \]

Mean scores of group when taught through smart class is 29.26 with S.D of 2.119 and conventional method is 22.63 with S.D. of 2.157. It means that boys when taught through smart class approach have high mean scores as compared against conventional method.

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SUM OF SQUARES</th>
<th>d.f.</th>
<th>MEAN SQUARES</th>
<th>F-RATIO</th>
<th>SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRECTED MODEL</td>
<td>1654.857</td>
<td>3</td>
<td>551.619</td>
<td>108.250</td>
<td>.000</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>95892.114</td>
<td>1</td>
<td>95892.114</td>
<td>1.882E+04</td>
<td>.000</td>
</tr>
<tr>
<td>GENDER(a)</td>
<td>7.314</td>
<td>1</td>
<td>7.314</td>
<td>1.435</td>
<td>.233</td>
</tr>
<tr>
<td>TEACHING METHOD (b)</td>
<td>1645.714</td>
<td>12</td>
<td>1645.714</td>
<td>322.955</td>
<td>.000</td>
</tr>
<tr>
<td>GENDER X TEACHING METHOD (aXb)</td>
<td>1.829</td>
<td>1</td>
<td>1.829</td>
<td>.359</td>
<td>.550</td>
</tr>
<tr>
<td>ERROR</td>
<td>693.029</td>
<td>136</td>
<td>5.096</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>98240</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORRECTED TOTAL</td>
<td>2347.886</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table III shows that F value for Gender is 1.435. The calculated value of F i.e. 1.435 is less than the tabulated value. Therefore, difference is insignificant, null hypothesis is not rejected. It means Hypothesis i.e. “There will be no significant difference in the academic achievement in chemistry of secondary school students when taught through smart classroom teaching and conventional teaching with respect to gender.”

Such hypothesis is not rejected as the difference is insignificant. Therefore the academic achievement in chemistry of secondary school boys and girls do not differ significantly on the basis of their gender.

**Interaction of Gender x method**

From table III, the F value of Interactional effect between gender x method is 0.359. The calculated F value for interaction of gender and method is 0.359 which is less than the tabulated value. Therefore, difference is insignificant and null hypothesis is not rejected. It means Hypothesis i.e. “There will be no significant interactional effect of Smart Classroom teaching, conventional teaching and gender on the academic achievement in chemistry of secondary school students.” is not rejected. It means there is no significant interactional effect of different teaching methods and gender on the academic achievement of secondary school students.

**XI. CONCLUSIONS**

In the light of above mentioned interpretation and discussion the main conclusions of the study are given below:
1. From the result of hypothesis-1 we conclude that the academic achievement in chemistry of secondary school students when taught through Smart Classroom teaching show greater achievement than conventional teaching.

2. From the result of hypothesis-2 we conclude that there is no gender difference in the academic achievement in chemistry of secondary school students when taught through Smart Classroom teaching and conventional teaching.

3. From the result of hypothesis-3 we conclude that interaction of gender and teaching method do not significantly affect the academic achievement in chemistry of secondary school students.

**XII. EDUCATIONAL IMPLICATIONS**

Educomp Smart Class plays an important role in the academic achievement in chemistry of students due to the following reasons:

1. Since there is a positive relationship between Smart Classroom teaching and academic achievement in chemistry of students, it imperative that the school plays a significant role in developing them.

2. Smart classes help students to a great extent. Students can interact, understand and remember things very easily as these are innovative where visuals have more impact than just reading. So smart class technology must be enhanced.

3. Smart classes provide better education through presentations and videos as well as all students may not understand the teaching methodology of a teacher but can understand by smart classes. So such an audio visual technology needs to be boosted in all kind of schools.

4. Smart classes create an attention in students which is known as interest. Inclusion of such a tool in schools ultimately enhances students’ academic interest.

5. Smart class is a good evaluative tool to teachers. To teachers such a digital initiative is so practical in modern times and friendly to use, where teachers can instantly evaluate/assess the learning achieved by their students in the class.

6. Smart Board is a time saving tutor which has inbuilt diagrams in its memory. So, no wastage of time is involved in drawing the diagrams and time is utilized more for the active learning part.

**REFERENCES**


