# Effectiveness of Smart Class on Achievement of Students in Science at the Upper Primary Level

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**Abstract**

*The present study investigated the effectiveness of smart class on achievement of students in science at upper primary level. The sample consisted of 60 students of Class VII of a public school of Udaipur city. The school was selected purposively and students were selected randomly. An experimental method was employed in the study. A true experimental design, i.e., pre-test, post-test equivalent group design was used. A pre-test was administered before the treatment, then a treatment of 21 days was given. The experimental group was taught through smart class, whereas control group was taught through conventional method of teaching. Then a post-test (achievement test) was administered on both the groups. A t-test was used for the analysis of data. The experimental group was found having significantly higher achievement scores as compared to the control group.*

## INTRODUCTION

Education is dramatically changing its form and structure in order to accommodate the expanding knowledge. Everyone wants to acquire more in less time be it the students or the teachers. Students have turned more demanding and inquisitive. Curriculum has developed extensively and has given a way to the contemporary approaches to teaching and learning. To add upon the knowledge revolution is the development in information technology which has also contributed to education technology. These changes have further revolutionised our classroom, thus impacting what we teach and how we teach.

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The new revolutionary programme in school education system 'Smart Class' has changed the concept of learning. It is an innovative technology that has aimed to revolutionise the way teachers teach and students learn in Class. Smart Class uses all interactive modules like videos and presentation and these visually attractive methods of teaching appeal to students who are already struggling with the traditional method of teaching in classroom. The curriculum is converted into animated visuals, which not only becomes an enjoyable experience for students but they can also relate to and remember facts easily.

For them, while learning in the classroom becomes a thrilling and existing experience, in the end they find abstract and difficult concepts easy to comprehend, thereby enhancing the academic performance. Such teaching helps to maintain the students' interest and focus by engaging them fully in the entire learning experience.

## Features of a Smart Class

A smart class is a class that has an instructor equipped with audio-visual equipment, allowing the instructor to teach using a wide variety of media. These include smart interactive white boards, DVDs, PPTs and more, all displayed through a projector. Smart class includes smart learning techniques, smart classroom management, smart learning environment and smart learning material. Internet, projector and multimedia devices are the main parts of a smart class.

The actual smart classroom system consists of five main components.

a. ***Video Projector System***: Includes a ceiling mounted projector and a large projection screen in the front of the classroom.
b. ***Audio System***: Includes a specified number of 2' × 2' speakers that are designed to replace the ceiling tiles, which allows for quality sound without invasive speakers taking up valuable space.
c. ***Control***: A smart board is the heart of the control system which operates the components of the system.
d. ***Video Camera/Visualiser***: It is similar to an old style overhead projector, except that the teacher does not have to use transparency papers only, but can also use any paper or project a three-dimensional object onto the screen, if required.
e. ***Smart Class Software***: It is tailored to the specific needs of the students.

In addition, each classroom is equipped with a VCR, DVD, microphone, wall phone, wireless radio frequency mouse and keyboard, a permanently mounted PC and a laptop port—all key pieces that complete the system.

Smart class has a unique delivery model for schools. A knowledge centre (server room) is created inside

the school equipped with entire library and smart digital content. The knowledge centre is connected to classroom through Internet. Teachers get relevant digital resources such as animation and videos, interactive virtual lab tools, etc., and use them as a part of their lesson plans in every classroom period. The classrooms are equipped with custom designed electronic interactive white board (smart board), a projection system, PCs and a visualiser to present teacher's own notes and also any object. Smart class is powered by a vast repository of digital instruction material exactly mapped to meet the specific objectives laid out by different stages of learning standards.

The content repository consists of thousands of highly animated lesson-specific 3D and 2D multimedia modules. These are built with an instructor-led designs that allow the teachers to effectively transact the lesson in a classroom. The modules help the students to understand the concepts easily. Teaching-learning process becomes joyful and useful. The modules are embedded in a template that allow the teacher to teach a selected lesson in a class, frame by frame,with enjoyable and instructionally sound animated sets of visuals. The curriculum reach unfolds from kindergarten to Class 12 covering subjects like Mathematics, Science, English, EVS, Social Science, Physics, Chemistry, Biology, History, Geography, Economics, Civics, Business Studies, etc.

Science is the subject in which almost all the topics (especially in Biology) need lots of visualisation to develop the concepts and understanding. Researcher believes that in order to cater this need of visualisation, the smart classes are the most appropriate way. As far as upper primary level is concerned, it is the level which helps in forming introductory concept of any subject for higher classes. It is necessary to make Science interesting, meaningful and applicable. Thus, clear understanding of any topic in the syllabus is quite necessary at this level, otherwise it may lead to conclusion and burden at higher stages in education. In this regard, smart classes also provide the facility to scale up environment and to visualise abstract concepts. The question is, how does smart class affect the achievement of students at this level.

## Objectives

- To study the effectiveness of smart class on achievement of students in Science.
- To compare the result of students' studies through smart class and conventional class.

## Hypotheses of the Study

(i) There is no significant difference between pre-test mean scores of achievement of students of experimental and control group.

(ii) There is no significant difference between post-test mean scores of achievement of students of experimental and control group.

## Operational Definitions

### (i) Smart Class

Smart Class is a class that includes smart learning techniques, smart classroom management, smart learning environment, smart class software, etc. Internet, projector, smart board, a visualiser and other multimedia devices are main parts of a smart class. Teachers get relevant digital resources and use them as part of their lesson plan in every classroom period. The content is in the form of 3D and 2D multimedia modules. These are embedded in a template to teach a chosen lesson in class, frame by frame.

### (ii) Conventional Class

It is a regular classroom which keeps the teacher in the centre and uses lecture method for teaching the students. Teaching aids such as charts, maps, models, etc., are used.

### (iii) Achievement

It generally refers to how well a student is accomplishing his or her tasks and studies.

For the purpose of the study, achievement is defined in terms of the marks obtained by students in Science in the achievement test constructed by the researcher.

## Variables

(i) **Independent variable**: Teaching method was taken as independent variable and it had two levels, i.e., smart class method and conventional class method.

(ii) **Dependent variable**: Achievement of students in science test was taken as the dependent variable.

(iii) **Controlled variable**: Subject, content and teaching time were selected as controlled variables.

## Area and Type of Research

The study deals with educational technology because of the use of smart class. The research could be considered as behavioural research because its result can be applied in day-to-day life.

## Design of Research

The study measures the effectiveness of the two types of classes in which teaching was required, therefore it was undertaken through experimental method. A true experimental design, i.e., pre-test post-test equivalent group design was selected.

## Delimitations

(i) One English medium public school of Udaipur city was taken for the study.

(ii) Only 60 students of Class VII were included in the study.

(iii) The study was delimited to topics of Biology.

## Sample

The school was selected purposively where smart class was available. Sixty students of Class VII of a public school of Udaipur city were selected randomly. A section of Class VII (out

of four sections) was selected through lottery system. An achievement test was administered on all the students of the selected section. The students were arranged in descending order of marks obtained by them in the achievement test. Then they were selected one by one in both groups randomly to form two equivalent groups, i.e., experimental and control group.

## Procedure

Teaching programme for the smart class and conventional class were prepared by the researcher which included the selection of content, timetable and lesson plans as per period. The nature and requirement for the two classes were kept in mind while preparing these programmes.

A pre-test (achievement test) was administered before the treatment. Then a treatment of 21 days was given. The experimental group was taught through smart class and control group through conventional method. After treatment, a post-test (achievement test) was administered for collection of data.

## Tools

(i) Computer software—Educomp Smart Class Solution (K-12).

(ii) An achievement test in science constructed by researcher.

## Analysis and Interpretation of Data

### (i) The difference between pre-test scores of the students of experimental and control group

As shown in Table 1, the t-value of pre-test scores of students of experimental and control group is statistically not significant. Thus, it may be said that both the groups were academically equal or homogenous in nature before the experimental treatment was given.

**Table 1**

| Group | N | Mean | S.D. | Mean Difference | t-value | p-value | Significant/ Not significant |
|---|---|---|---|---|---|---|---|
| Experimental group | 30 | 18.10 | 4.286 | 0.33 | 0.31 | 0.974 | *Not significant* |
| Control group | 30 | 18.07 | 3.991 | | | | |

**(ii) The difference between post-test scores of students of experimental and control group**

**Table 2**

| Group | N | Mean | S.D. | Mean Difference | t-value | p-value | Significant/ Not significant |
|---|---|---|---|---|---|---|---|
| Experimental group | 30 | 40.10 | 6.255 | 4.900 | 2.783 | 0.007 | Significant at 0.01 level |
| Control group | 30 | 35.20 | 7.341 | | | | |

As shown in Table 2, the t-value between the post-test score of students of experimental and control group is statistically significant. Thus, it may be said that this difference may be due to the experimental treatment given to the experimental group through smart class.

## Discussion

In the present study, the post-test scores showed that experimental group performed better in comparison to control group. It reveals that teaching through smart class is more effective for students in gaining achievement in science in comparison to the conventional method of teaching. It may be due to that in smart class the content was presented before the students in the form of multimedia modules in proper sequence. It includes videos, pictures, presentations, etc. We know that science is a subject in which almost all the topics, specially related to biology (organ systems, habitats of organisms, etc.), need visualisation. Sometimes students cannot understand the difficult concepts when taught in abstract form in conventional class, but when they visualise that content on smart board in an interesting way, it becomes joyful for them and helpful in better understanding of the concepts and this may result in better performance due to conceptual clarifications. So, smart classes may be useful for all types of students for better understanding of the concepts thereby enhancing the achievement level.

## Conclusion

The findings revealed that Smart Class is effective in enhancing achievement of students in Science at upper primary level, so teachers of Science as well as other subjects may utilise Smart Class as a part of teaching-learning process in order to improve achievement of students. The government and private schools may make available the basic infrastructure and other facilities required for teaching-learning through Smart Class. The administrators need to work proactively to ensure smart classroom

facilities in schools. During pre-service teacher preparation as well as continuing teacher development programmes, teachers need to get exposure to use smart classroom effectively, for that teacher education curriculum may include use of smart classroom in teaching/learning and development of software packages for the use in classroom.

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