Effect of Teaching through Smart Class on Achievement of Academically High and Low Achievers in Science

Abstract

The present study investigated the effect of smart class on Achievement of academically high and low achievers in science subject 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. The students (high and low achievers) were selected on the basis of their previous class final examination result as well as their scores in the achievement test (pre-test) constructed by researcher. 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. t-test was used for the analysis of data. The experimental group was found significantly higher achievement scores as compared to the control group for both high and low achievers. Study also revealed that smart Class is more effective for low achievers as compared to high achievers in science subject at upper primary level.

Keywords: Smart Class, Conventional Class, High Achievers, Low Achievers, Achievement.

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 for teaching and learning. To add uppon the knowledge revolution is the revolution in information technology which has also affected education technology. These changes have further revolutionized our classroom thus, impacting what we teach and how we teach.

The new revolutionary program in school education system 'Smart Class' has changed the concept of learning. It is an innovative technology that has aimed to revolutionize the way teacher teach and student learn in class. Smart class use all interactive module like videos and presentation and these visually attractive method of teaching becomes appealing 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 relate to and remember facts easily. For them, while learning in the classroom becomes a thrilling and existing experience, at the end they find abstract and difficult concepts easy to comprehend, thereby enhancing this academic performance. Such teaching helps to maintain the student's interest and focus by engaging them fully far the entire learning experience.

Features of Smart Class

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

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The actual smart classrooms system consists of five main components-

Video Projector System

Includes a ceiling mounted projector and a large projection screen in the front of the classroom.

Audio System

Includes a specified amount 2' × 2' speakers that are designed to replace the ceiling tiles, which allows for quality sound without invasive speakers taking up valuable space.

Control

A 12" LCD touch screen/smart board is the heart of the control system which operates the components of the system.

Video Camera

It is similar to old style overhead projector, except the teachers does not have to use transparency papers only, but can also project a three-dimensional object onto the screen, if required.

Proprietary Control 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 key board, 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 classroom are equipped with custom designed electronic interactive white board (smart board), a projection system, PC's and a visualizer to present teacher's own notes and also any object. Smart class is powered by a vast rapocity of digital instruction materials exactly mapped to meet the specific objectives laid out by different stage learning standards.

The content repository consists of thousand of highly animated lesson specific, 3D and 2D multimedia modules. These are built with an instructor - led designs that allow the teachers to effectively transect the lesson in a classroom. The modules helps the students to understand the concept easily and interact with other students. Teaching learning process becomes joyful and useful. The modules are embedded in a template that allow the teacher to teach a chosen lesson in a class, frame by frame, with enjoying and instructionally sound animated sets of visuals while retaining complete control on the place of delivery. The curriculum reach unfold from kindergarten to twelve grade covering subjects like Mathematics, Science, English, EVS, Social Science, Physics, Chemistry, Biology, History, Geography, Economics, Civics, Business studies etc.

Theme of Smart Classroom

There are three themes in Smart Classroom smart Pedagogy, smart learning space and smart teaching solutions.
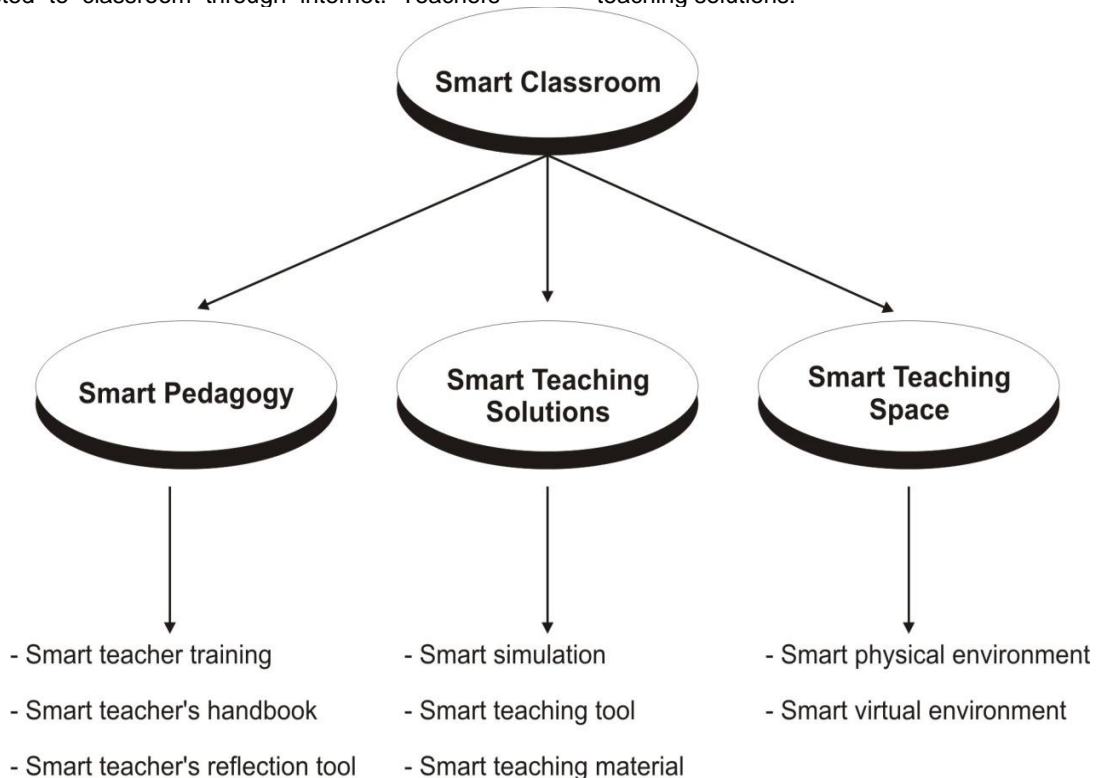
Science is the subject in which almost all the topic needs lots of visualization to develop concept and understanding. Researcher believes that in order to cater this need of visualization, the smart classes are most appropriate way. As far as upper primary level is concern, it is the level which helps in forming

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introductory concept of any subject for higher classes. It is necessary to make science subject interesting, meaningful and applicable. Thus clear understanding of any topic in the syllabus is very necessary at this level, otherwise it may leads to conclusion and burden in higher stages in education. In this regards smart classes also provides the facility to scale up environment and to visualize abstract concepts. The question is how does smart class affects the achievement of students at this level?

There are different kind of students regarding their scores in achievement tests. Out of them most students are of average achievement group, but some students in each class are high and low achievers. This is a challenge for teacher that how to increase in achievement of low achievers. Again the question is how does smart class affects the achievement of high and low achievers?

Hence, the researcher considered it important to explore whether the use of smart class affects the achievement of high and low achievers in science subject at upper primary level?

Objective of the Study

The objective of the present research were as follows

1. To study the effect of teaching through smart class on achievement of academically high achievers in science.
2. To study the effect of teaching through smart class on achievement of academically low achievers in science.
3. To compare the effect of teaching through smart class on achievement of academically high and low achievers in science.

Major Hypotheses

1. There is no significant difference between pre-test mean scores of achievement of high achievers of experimental and control group.
2. There is no significant difference between pre-test mean scores of achievement of low achievers of experimental and control group.
3. There is no significant difference between post-test mean scores of achievement of high achievers of experimental and control group.
4. There is no significant difference between post-test mean scores of achievement of low achievers of experimental and control group.
5. There is no significant difference between the achievement gain mean score of high achievers of experimental and control group.
6. There is no significant difference between achievement gain mean scores of low achievers of experimental and control group.

Operational Definitions

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 visualizer and other multimedia devices are main parts of smart class. Teachers get relevant digital resources and use them as a part of their lesson plan in every classroom period. The content are in form of 3D and 2D multimedia modules. These are embedded in a template to teach a chosen lesson in class frame by frame.

Conventional Class

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

High Achievers

Academically, high achiever is a student who gets high marks or good grades than average students. A person who achieve more than the average person in their work and achieves a specified level of success

Low Achiever

The term 'low achiever' refers to those students who get lower grades or less marks than the average students.

Achievement

It is 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

Independent Variable

Teaching method was taken as independent variable and it had two levels i.e. smart class method and conventional class method.

Dependent Variable

Achievement of students in science test was taken as the dependent variable.

Controlled Variable

Subject, content and teaching time were selected as controlled variable.

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 measure the effectiveness of 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

1. Only one English medium public school of Udaipur city was taken for the study.
2. Only 60 students of class VII was included in the study.
3. The study was delimited to topics of Biology.

Sample

The school was selected purposively where smart class was available. 60 students (high and low achievers) of class VII of a public school of Udaipur city were selected randomly. The students were selected on the basis of their previous class final examination result as well as on the basis of scores of the achievement test (pre test) constructed by researcher. Then they were divided into experimental and control group equally. Both the groups were

made homogeneous academically before the treatment.

Procedure

Teaching program for the smart class and conventional class were prepared by the researcher which includes the selection of content, time table and lesson plans as per period. The nature and requirement for the two classes were kept in mind while preparing these programs.

A pre-test (Achievement test) was administered before treatment. Then a treatment of 21

Analysis and Interpretation of Data

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.

Tool

1. Computer software - Educomp smart class solution (K-12)
2. An achievement test in science constructed by researcher.

The difference between Pre-Test Mean Scores of Achievement of the High Achievers of Experimental and Control Group

Table 1

Group	N	Mean	SD	Mean difference	t value	P value	N or NS
High Achievers of Experimental group	15	22.13	1.356	0.267	0.649	0.522	Not significant
High Achievers of Control Group	15	21.87	0.834				

The 't' value of pre-test scores of high achievers of experimental and control group is statistically not significant. Thus it may be said that both the groups (high achievers of experimental and control group) were academically equal or homogeneous in nature before the experimental treatment was given.

The Difference between Pre-Test Scores of the Low Achievers of Experimental and Control Group

Table 2

Group	N	Mean	SD	Mean difference	t value	P value	Significant/ non-significant
Experimental group	15	14.07	1.598	0.20	0.471	0.641	Not significant
Control group	15	14.27	1.163				

The 't' value of pre-test scores of low achievers 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.

The difference between post-test mean scores of achievement of high achievers of experimental and control group

Table 3

Group	N	Mean	SD	Mean difference	t value	P value	S or NS
High Achievers of Experimental group	15	46.13	1.125	3.867	8.202	0.000	Significant at 0.01 level
High Achievers of Control Group	15	42.27	1.438				

On the basis of above analysis it is clear that the "t" value between post-test score of high achievers 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 high achievers of experimental group through smart class.

The difference between post-test scores of low achievers of experimental and control group

Table 4

Group	N	Mean	SD	Mean difference	t value	P value	Significant/ non-significant
Experimental group	15	34.07	1.335	5.933	11.039	0.000	Significant at 0.01 level
Control group	15	28.13	1.598				

The 't' value between the post test score of low achievers 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.

The Difference between Achievement Gain Mean Score of High Achievers of Experimental and Control Group

Table 5

Group	N	Mean	SD	Mean difference	t value	P value	S or NS
High Achievers of experimental group	15	24.00	0.845	3.60	10.739	0.000	Significant at 0.01 level
High Achievers of Control group	15	20.40	0.986				

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On the basis of above analysis it is clear that the 't' value between the achievement gain mean score of high achievers of experimental and control group is statistically significant. Significant high gain in achievement mean score of high achievers of experimental group in comparison to high achievers of control group reveals that teaching through smart class is more beneficial in gaining in achievement of high achievers in comparison to conventional teaching method.

The Difference between Achievement Gain Mean Score of Low Achievers of Experimental and Control Group

Table 6

Group	N	Mean	SD	Mean difference	t value	P value	S or NS
Low Achievers of experimental group	15	20.00	0.756	6.133	19.065	0.000	Significant at 0.01 level
Low Achievers of Control group	15	13.87	0.990				

On the basis of above analysis it is clear that the 't' value between the achievement gain mean score of low achievers of experimental and control group is statistically significant. Significant high gain in achievement mean score of low achievers of experimental group in comparison to low achievers of control group reveals that teaching through smart class is more beneficial in gaining in achievement of low achievers in comparison to conventional teaching method.

The achievement gain mean difference of high achievers of experimental and control group is 3.60 whereas the achievement gain mean difference of low achievers of experimental and control group is 6.13. So it can be concluded that smart class is more beneficial in gaining in achievement of low achievers in comparison to high achievers in science subjects.

Conclusion

The finding of the present study showed that teaching through smart class is more effective than conventional method of teaching for both high achievers and low achievers for gaining in achievement in science subject at upper primary level. Findings also revealed that smart class is more effective for low achievers as compared to high achievers in gaining in achievement in science subject.

Educational Implications

The educational implications of the present study are as follows :

1. The finding revealed that smart class is effective in enhancing learning among high and low achievers at upper primary level in terms of their achievement. Hence teachers may use smart class software for increasing achievement of the students in Science and also in other subjects .
2. The teacher education curriculum may include smart class software and its use in teaching/learning so that they are able to guide scholars who prepare such package based on school syllabus.
3. The government and private school may make available the basic infrastructure and other facilities required for teaching-learning through smart class.
4. The software companies may prepare smart class software in different subjects for different classes in local/regional languages.

5. All agencies in the field of curriculum development such as National Council of Educational Research and Training (NCERT), State Institute of Educational Research and Training (SIERT) and National Council for Teacher Education (NCTE) may prepare smart class software in various subjects and at different level of education.

Suggestions

In the present study, the experimental group was taught through smart class and control group through conventional teaching method. On the basis of this treatment and findings of the study following are some suggestions which may be useful for school administrators, teachers and students.

For School Administrator

As the finding shows that smart classes are effective in better achievement among high and low achievers, the school administration should provide all facilities required to operate smart classes. They should provide the proper training to teacher for operating smart class. Administrator and principal should also ensure that teachers are properly operating the smart board in teaching-learning process or not. They should make available smart class software in all subjects and for each level.

For Teachers

1. In smart class, the smart class module should not only shown to students, instead teachers should interact with students after and before the presentation of each module for better understanding among them. Also, teachers should replay the module if some students are unable to understand the difficult content at once. This may be specially helpful for low achievers or weak students in class.
2. Teachers should use his/her own notes, diagrams, review question etc. on smart board and can also show any object etc. on smart board with the help of visualizer.
3. The finding shows that the high and low achievers of control group who were taught through conventional method of teaching had showed the positive effect on their achievement. Through this finding it appears to researcher that conventional method with the involvement of psychological principles in teaching also has the positive impact on achievement of students (both

high and low achievers). So the conventional method should enriched with the law of readiness for learning, mostly the visuals as teaching aids and the crux of teaching methodology i.e. more involvement of learners in teaching-learning process which is helpful in conceptual clarification of the content.

For Students

1. Students should interact with teacher before and after presentation of modules. They can request their teacher to replay the module if they do not understand any content. They should ask their quarries to clear doubts.
2. Students should also know how to operate smart class equipments. So they can use them to understand the difficult content as they can select, pause or replay the smart class modules on smart board in presence of their teacher and sometimes also in absence of their teacher.

Suggestions for Further Researches

In the field of research, results of one study often open the pathways for other studies on related aspects. On the basis of the present study, the following dimensions can be explored in future studies

1. The present research was conducted on a small sample and it may be replicated with a larger sample at a different place (city/state/national level) and in a different context (rural area).
2. The present study was limited to private school. A similar study could be conducted in government schools.
3. The effect of smart class in subjects other than science can be studied.
4. The effect of smart class in science at secondary, sr. secondary and college level taking high and low achievers as sample may be studied.
5. Studies related to the effect of smart class on achievement of high IQ, medium IQ and low IQ students can be conducted at primary, upper primary, secondary and sr. secondary level in science and other subjects.
6. In further studies the relationship between effect of smart class and the placement of instruction in terms of time of exposure in teaching learning procedure may also be investigated. This means exposure through smart class only. Exposure through smart class along with teacher's lecture and exposure of smart class after teacher's lecture can be studied.
7. The effect of teaching through smart class and conventional method an achievement was compared in present study. Smart class teaching can be compared with other teaching methods like constructivist approach, inquiry approach and project method.
8. Further studies may observe the effect of smart class on other dependent variables like problem solving ability, reflective thinking, divergent thinking, attitude, aptitude, study habits and interest of the students at different level.
9. The present study was experimental in nature, further study may conducted to know opinion of students, teachers, principals and administration

about smart class on different aspects through a survey.

10. Effectiveness of smart class software in distance learning may also be explored.

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