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Research Article

A Study Of The Effect Of The Use Of Educational Technology On The Achievement Of Slow Learners In Science Subject At The Secondary School Level

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ABSTRACT

The present research is an attempt to Study the Effect of the Use of Educational Technology on the Achievement of Slow Learners in Science Subjects at the Secondary School Level. The present study is Quantitative in nature. Considering the nature of the present research, the Experimental Research Method of Quantitative nature has been taken. Pre-test and Post-test designs are used for the study. The population of the study consists of secondary school students of Prayagraj City. Slow learner students of science subject of 9th class have been selected. Only the students of the U.P Board of 9th class studying in government and non-government schools of Prayagraj city have been taken as a sample. Two schools -TejPratap Singh Intermediate College, Saidabad (non-gov. aided) and KeshavShikshaSadan, Saidabad (govt. aided) have been taken. The sample is divided into two groups. One group has been taught by Traditional Methods and the second group has been taught by video lessons using Educational Technology. The self-made tool of Achievement by the researcher has been used in the study. The result of the study indicates that ‘’There is a significant difference between the pretest achievement scores and post-test achievement scores of slow learners taught by using educational technology and through traditional methods in science subjects”. It indicates that teaching science subjects by using educational technology is significantly more effective than teaching through traditional methods.

Keywords: Educational Technology, Slow Learners, Achievement, Science subject, Secondary Schools.

Since ancient times, India has been famous by the name of Vishwa Guru. Here many learned sages adopted teaching work and discovered various teaching methods to spread knowledge and make learning easier. For the progress of any country, the e-education system of that country and the educational level of the people there play a very important role. The fate of a country is built on the classes of that country.
Henry Adams (1907) also observed that whatever is taught to the child by the teacher, affects the child for eternity.
At present, every aspect of human life has been affected by scientific inventions. Scientific inventions have also affected the field of education. With the increasing use of computer audio-visual aids in the field of education, with the increasing use of projectors, tape recorders, etc., education is also getting closer to technology.

Educational Technology

The first attempt in the field of educational technology in India was made by the Ministry of Education. In 1942, the Government of India established the Central Film Library to improve classroom teaching. At that

time teacher education colleges in India used to have teaching aids or audio-visual departments which provided chart model projectors and slides for effective teaching. In 1947, the Ministry of Education strengthened this initiative by setting up a production unit in the Central Film Library.

After the establishment of NCERT IN 1961, The Indian Association of Programmed Learning was formed by NCERT, NEW DELHI in 1966, with the objectives of research awareness generation in the field of educational technology, to encourage research and to create helpful materials for effective teaching. The Indian Association of Programmed Learning disseminated the use of educational technology to various centres of education located in different parts of the country. In the year 1973, a separate organisation named the Centre for Educational Technology was established under NCERT. In the year 1975-76, the Satellite Instructional Television Experimental Project was conducted by ISRO.

The first phase of educational technology was from 1973 to 1983, in which the establishment of CET institutions in NCERT and educational technology units were established in 6 states.

The second phase of educational technology started in 1983. In this phase, CIET and State Institutes of Educational Technology were established in the form of SIET (State Institute of Educational Technology) in Andhra Pradesh, Uttar Pradesh, Odisha, Maharashtra, Gujarat, and Karnataka. INSAT-1B was launched by ISRO in 1983. It belongs to the joint venture of the Meteorological Department, Department of Space Telecommunications, Government of India. In 1986, educational technology was used in educational policy to enhance quality education.

The third phase of educational technology started in 1995. In this phase, audio-video conferencing was used for educational purposes. An educational channel named GyanDarshan was started in the year 2000 and a channel named Gyanvani was started in the year 2001. All these achievements hold an important place in the field of educational technology.

At present educational technology has been divided into three forms: Hardware Approach, Software Approach and System Approach.

The Association for Educational Communications and Technology (AECT) has defined educational technology as: ''Educational technology is the practice of attempting to improve learning and achievement by creating, using and managing appropriate technological processes and resources.''

Many studies have been done to see the effectiveness of educational technology in teaching as compared to traditional methods of teaching. Some of them are:

- Neera (1998), compared the effectiveness of video-teaching learning materials, video aided instruction, and traditional methods and concluded that: Students are more inclined toward video-teaching learning material. Video teaching learning material and video-aided instruction showed a positive increase in the retention power of the students as compared to the traditional method. There is a significant difference between the achievement of students taught by traditional methods and the achievement of students educated by video teaching learning material and video-aided instruction.
- Aggarwal and Tyagi (2008), studied the effectiveness of computer-based learning materials on 10 class students. An experimental research method was used in the study. They used Pre-test and post-test research designs and took experimental and controlled groups. In conclusion, it was found that studying through computer-based material can be beneficial for slow learners. Studying by these methods leads to the higher achievement of the students.

All the review of previous research indicates that the use of educational technology in the teaching-learning process enhances learning. The Achievements of students have also been positively affected by the use of educational technology.

The National Policy on Education, 1986 (NPE) has also emphasised the need to strengthen science education programs ''So as to develop the child well-defined abilities and values enable the learner to acquire problem-solving and decision-making skills and to discover the relationship of science with health, agriculture, industry and other aspects of daily life.

Identification of slow learner students

A slow learner is a child whose thinking skills and scholastic performance have developed significantly more slowly than the pace of his or her age students.

Vygotsky's zone of proximal development theory (1978) holds its place in the subject of slow learners' achievement. The achievement of slow learners is generally disappointing and they need help.

The problems of physically challenged children are clearly visible but the difficulties and barriers of academically slow learners are never clearly visible. Such students are not able to meet the normal demands of education and life in society. These students can be identified in the following ways:

- Language patterns of these children are immature
- Such children suffer from frustration, aggression, and anxiety
- These children prefer the company of children younger than their age.
- Takes longer than other children to understand and learn a task
- Their memory is bad
- These children cannot transfer the knowledge learned in one situation to another situation.

Need and Significance of the Study

Science is the mother of technology. Technology is the use or application of scientific knowledge for a specific goal or purpose. In this present era of science and technology, so many experiments are being done in the world of education. In comparison, there has been a vast change in the teaching style and process as in the past. In this era of technology, there has also been a change in the teaching-learning process of science subjects. Science in particular when it comes to learning slow learners, interest can be generated towards their subject by the wide and proper use of educational technology and the result of effective achievement can also be found.

Therefore, in this era of science and technology, there is a need for extensive use of educational technology in science subjects as well. Especially according to the subject, the relevance of science at the secondary level and its use in their future life and in ensuring their future goals in the direction of engineering and medicine also prove to be definitely helpful. Therefore, the study is necessary to ensure the use of educational technology for students in the science subject at the secondary level.

Statement of the problem

A study of the effect of the use of educational technology on the achievement of slow learners in science subjects at the secondary school level

Objectives

- To study the effect of the use of educational technology on the achievement of students in science at the secondary level
- To study the effect of the traditional method of teaching on the achievement of students in science subjects at the secondary level
- To compare the study of the effect of the use of educational technology and the traditional method of teaching on the achievement of the students of science subjects at the secondary level.

Hypothesis

- There is no significant difference between the pre-test achievement scores and the post-test achievement scores of the slow learners students in science taught by using educational technology
- There is no significant difference between pre-test achievement scores and post-test achievement scores of slow learner students in science taught by traditional methods of teaching
- There is no significant difference between the effect of teaching through educational technology and teaching by using traditional methods on the achievement of students of science subjects at the secondary school level.

Sample

A total of 40 students have been taken as a sample. 20 students taken from each school.

The sample is divided into two groups. One group has been taught by traditional methods and the second group has been taught by video lessons using educational technology.

There are three variables in the study:

Independent variable - Educational Technology

Dependent variable - Achievement

Control variables - Class, Age, Syllabus, and Medium of Teaching

To reduce the effect of class and age only 9th-class students have been selected, whose age limit lies between 15-16 years. All the students were taught through the same medium of instruction. Both schools follow the same curriculum prescribed by the state.

Research Design

Pre-test and Post-test designs are used for the study.

Group	Pre-test	Treatment	Post-test
Experimental group	O_1	X_1 (video lesson)	O_3
Control group	O_2	X_2 (traditional method)	O_4

A Self-Made Tool of Achievement by the researcher has been used in the study. A description of the tool is given below:

Blueprint of Science Achievement Tool

Subject: Science Total questions:40

Class: 9th Time: 1 hr

Objectives	Knowledge	Comprehension	Application	Analysis	Total Questions
Weightage	27.5%	30%	30%	12.5%	100%
Content - Weightage					
1. Matter, Nature and Behaviour - 55%	4	6	6	3	19
2. Motion, Force and Work - 45%	7	6	6	2	21
Total - 100%	11	12	12	5	40

40 multiple choice questions have been taken. A 1-hour time limit has been set for the test. 1 mark to each question, Total marks 1*40= 40

Data Analysis

Objective 1: To study the effect of the use of Educational Technology on the achievement of students in science at the secondary level.

Firstly, the achievement scores of both the schools of class 9th were analysed separately, and later on, scores were analysed together.

School-1

	n	M	SD	Df	MD	σ_D	t	Significance difference
Pre-test	10	14.2	3.4576	18	13.6	1.5462	8.7953	At 0.01
Post-test	10	27.8						

The value of t is 8.7953 which is significant at 0.01. It means that there is a significant difference between Post-test achievement scores and Pre-test achievement scores. Therefore the null hypothesis '' There is no significant difference between the pre-test achievement scores and post-test achievement scores of slow learners in science taught by using educational technology is rejected.

School-2

	n	M	SD	Df	MD	σD	t	Significance difference
Pre-test	10	15.7	2.766	18	9.5	1.236	7.680	At 0.01
Post-test	10	25.2						

The value of t is 7.680, which is significant at 0.01 level. Therefore, there is a significant difference between the pre-test achievement scores and the post-test achievement scores. Hence, the null hypothesis '' There is no significant difference between the pre-test achievement scores and post-test achievement scores of slow learners in science taught by using educational technology" is rejected.

Combined Study of Experimental Group

Pre-test and the post-test achievement scores of experimental groups of both schools are as follows:

	n	M	SD	Df	MD	σ_D	t	Significance difference
pre-test	20	14.95	3.2361	38	11.55	1.023	11.286	At 0.01
post-test	20	26.5						

The value of t is 11.2865 which is significant at 0.01 level. Therefore, there is a significant difference between the pre-test achievement scores and the post-test achievement scores. Hence, the null hypothesis ‘’There is no significant difference between the pre-test achievement scores and the post-test achievement scores of slow learners in science taught by using Educational Technology” is rejected.

Marks increase in the Academic Achievement of Students in Teaching by the use of Educational Technology

Sr. No.	Schools	No. of Students	Pre-test scores	Post-test scores	Marks increase	Average Marks Increase
1.	School 1	10	151	225	74	9.50%
2.	School 2	10	157	202	95	6.50%
Total		20	308	427	169	8.00%

From the above table, it is clear that teaching through the use of educational technology significantly increased the achievement of learning of slow learners in science at the secondary level. In the study, the average score of the students of the experimental group increased by 8.0.

Objective 2: To study the effect of traditional methods of teaching on the achievement of students in science subjects at the secondary level.

Analysis and Interpretation

School-1

The statistical analysis of the achievement marks obtained from the pre-test and post-test of the school are as follows:

	n	M	SD	Df	MD	σ_D	t	Significance difference
Pre-test	10	17.2	3.783	18	4.8	1.691	2.837	At 0.01
Post-test	10	22						level

The parametric value of the t-ratio is 2.837, which is significant at 0.01 level. It means that there is a significant difference between pre-test achievement scores and post-test achievement scores. Hence, the null hypothesis ‘’There is no significant difference between the pre-test achievement scores and post-test achievement scores of slow learners in science taught by using traditional methods of teaching” is rejected.

School-2

The statistical analysis of the achievement scores of the pre-test and post-test of this school are as follows:

	n	M	SD	Df	MD	σ_D	t	Significance difference
Pre-test	10	13.6	4.00	18	7.1	1.790	3.965	At 0.01
Post-test	10	20.7						

The parametric value of the t-ratio is 3.965, which is significant at 0.01 level. It means that there is a significant difference between the pre-test achievement scores and the post-test achievement scores. Hence, the null hypothesis ‘’There is no significant difference between the pre-test achievement scores and post-test achievement scores of slow learners in science taught by using traditional methods of teaching” is rejected.

Combined Study of Control Group

The statistical analysis of pre-test achievement scores and post-test achievement scores of both schools are as follows:

	n	M	SD	Df	MD	σ_D	t	Significant difference

Pre-test	20	15.4	4.028	38	5.95	1.273	4.670	At 0.01
Post-test	20	21.35						

The parametric value of t is 4.670 which is significant at 0.01 level. Therefore, there is a significant difference between the Pre-test achievement scores and Post-test achievement scores. Hence, the null hypothesis" There is no significant difference between the pre-test achievement scores and the post-test achievement scores of slow learners in science taught by using traditional methods of teaching" is rejected.

Marks Increase in the Achievement of Students through Traditional Methods of Teaching

Sr. No.	Schools	No. of Students	Pre-test Scores	Post-test Scores	Marks Increase	Average Marks Increase
1	School 1	10	172	220	48	2.79%
2	School 2	10	136	207	71	5.22%
Total		20	308	427	119	4.005%

From the above table, it is clear that through traditional methods of teaching the achievement of slow learners is less as compared to the achievement of experimental groups in science subjects at the secondary level. From the above table, the average mark increase in the students of the control group is 4.005.

Objective 3: To compare the study of the effect of the use of educational technology and the traditional method of teaching on the students of secondary school

	n	M	SD	Df	MD	σ_D	t	Significance difference
Pre-test	20	21.35	2.950	38	5.15	0.933	5.519	At 0.01
Post-test	20	26.5						

The parametric value of t-ratio is 5.519 which is significant at 0.01 level. It means that there is a significant difference between the achievement scores of students taught by traditional methods and by the use of educational technology. Hence, the null hypothesis "There is no significant difference between the effect of teaching through educational technology and teaching by using traditional methods on the achievements of students of science subjects at secondary school level" is rejected.

Average Marks Increase

Sr. No.	Schools	No. of Students	Pre-test Scores	Post-test Scores	Marks Increase	Average Marks Increase
1	School 1	20	308	427	119	5.95%
2	School 2	20	299	530	231	11.55%

The average mark increase in the control group is 5.95% and in the experimental group the average mark increase is 11.55%.
Therefore, it can be said that teaching by the use of educational technology has significantly affected the achievement of slow learners of science subjects at the secondary school level.

Conclusion

There is a significant difference between the Pre-test achievement scores and Post-test achievement scores of slow learners taught by using educational technology and through traditional methods in science subjects. It indicates that teaching science subjects by using educational technology is significantly more effective than

teaching through traditional methods. Therefore, if the teaching-learning process in schools is done by using educational technology then the academic achievements of students will significantly increase.

Educational Implications

- Students can have a clear understanding of the subject matter. For this, teachers should take the help of educational technology
- Child-centred learning should be used in presentations during the teaching-learning process.
- The use of educational technology develops teachers in their teaching ability. Teachers should be given proper training for the proper use of educational technology.
- The speed of learning of the students increases through the use of educational technology and also generates interest in the subject among students.

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