

Effectiveness of Video Based Instruction among Secondary School Biology Student's Academic Achievement: An Empirical Study

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Abstract: In modern day classrooms teaching and learning process has taken a paradigm shift and the video-based instruction has provided a new impetus to it. Video assisted instruction can provide a consistent form of teaching and can communicate certain concepts in a visual and realistic manner as compared to the conventional method of teaching which is lecture or lecture cum demonstration method. The investigator followed an experimental research approach for this study. In the present study the investigator undertook a sample of thirty secondary school students and used a pre-test and post-test equivalent group of experimental design. A pre-test was conducted for both the control and experimental groups and the treatment through video-based lectures was given to the experimental group and conventional method of teaching to the control group for the selected content. At the end of the treatment a post-test was conducted on both control and experimental groups. At the end of the study it was found that the pre-test academic achievement scores in biology of both the control and experimental group students were similar. The post-test mean academic achievement scores in biology of the experimental group students is higher than the control group students on total sample and the post-test mean academic achievement scores in biology of control and experimental group students are better than the pre-test mean academic achievement scores of control and experimental group students with regard to gender and locality. The purpose of the present paper was to evaluate that how the implementation of an educational video for the selected content was able to influence the understanding of the educational process and how it has been able to improve the academic performance of the students in classroom in comparison to conventional method of teaching. This paper elaborates that video should be used as a facet of instruction along with other resource material available to a teacher so as to effectively teach and improve the overall academic achievement of the biology students.

Keywords: Videos assisted instruction, ICTs, Web-based technology, Methods of teaching biology, Educational video, Inquiry-based teaching.

1. INTRODUCTION

Effective teaching in any subject depends largely upon introduction of new methods of teaching. Students need unique experience in the presentation of the content. It is therefore, an urgent need to teach through new methods of teaching and learning. Teaching by Video based instruction provides unique experience to students. Video based instruction can provide a consistent form of teaching and can communicate certain concepts in a visual and realistic manner. It refers to recording, manipulating and displaying moving images, especially in a format that can be presented on a television. Video based instruction may also be helpful to look through lesson plans form other institutions for ideas on how video has been effectively used to illustrate specific topics. Furthermore, video education has been shown to be superior to traditional method and improve knowledge. The purpose of this study was to evaluate that how the implementation of an educational video on the teaching would influence the understanding of educational process and satisfaction in a group of students.

There is endless number of ways to exploit video in order to create motivating, memorable and inclusive learning experiences. However, watching a video can also be a passive experience and so teaching methods must be used which instead turn it into a springboard for student action and interaction. Befor3e deciding to use video for teaching purposes, it

is vital to watch all the material to be shown to students beforehand, just in case there is any unnecessary or unsuitable content. Video based instruction may also be helpful to look through lesson plans from other institutions for ideas on how video has been used effectively so as to illustrate specific topics.

Teaching of Biological Science through Video

Inquiry-based teaching is central to the Indian National Science Education Standards and the benchmarks for science literacy should not be an isolated occurrence, but a comprehensive and ongoing approach. However, many teachers hesitate to teach biological science through inquiry because they did not learn this way themselves, when they were students or during their preparation to become teachers. Science teachers frequently scour the web for short videos, knowing they can be powerful tools for demonstrating hard-to-explain concepts and piquing students' interest in their subject. The new science take series in the times is full of such videos, taking advantage of time-lapse photography and high-speed video to reveal the natural world's secrets. Additionally the topics related to scientific research methodology and social science methods of research are shown through video-based lectures so as to explain the scientific ideas and show the beauty in nature of educational and social science research.

Educational Video and the Classroom

There is substantial research promoting the use of video in the classroom as a dynamic resource for supporting curricula. According to a recent teacher survey, 97% of classroom teachers have effectively used video during the course of their academic sessions and most of the teachers were frequently using--on an average once per week. But the question is why? As teacher educators, the aim is to get students energized and engaged in the hands-on learning process, and video-based instruction is clearly an instructional medium that is compelling and generates a much greater amount of interest and enjoyment than the more traditional printed material. Using sight and sound, video is the perfect medium for students who are auditory or visual learners. With the added use of subtitles each child then has the choice to watch, listen to, or read each presentation. Video stimulates and engages students creating interest and maintaining that interest for longer periods of time, and it provides an innovative and effective means of educators to address and deliver the required curriculum content.

Consider teaching with the voices from the past by introducing students to great historians, political figures and famous people who lived centuries ago. Envision the classroom in which children hear the cry of a nearly extinct species and see the colors and hear the sounds of animals that thrive only in a remote wilderness half way around the world. And what about investigating the laws of motion, sound and energy transfer by viewing the launch of the space shuttle on its voyage into space? Think about how much easier it would be to understand the diverse cultures of people who live in other areas of the world if you could encounter them in their own environments----hearing their songs, observing their rituals or listening to their silence. The benefits of using video in education includes providing a sensory experience that allows concepts and ideas to actually become an experience and come to life as students are guided through each adventure.

Video Based Instruction as a Flexible Teaching Component

The more interested and engaged students are, and the more interactive each learning session is, the more students will enjoy, learn from and retain information from the lesson. Video provides a means of interactive instruction and is a very flexible medium. Having the ability to stop, start and rewind is absolutely invaluable. It provides the option to stop each video and challenge students to predict the outcome of a demonstration, and elaborate on, or debate a point of historical reference. One may also have the option to rewind a section of the video to review a segment to ensure that children understand a key concept. One can also ensure to add further interactivity by copying activities, conducting discussions or repeating demonstrations and experiments in the classroom.

Video Support Tools

If students and teachers are to receive the maximum benefits from the use of video in education, the video should be supported by a selection of other tools and resources that enable each topic to be fully investigated and explored. The use of online videos should be supported by the use of an interactive glossary, dictionary, thesaurus and an online encyclopedia. Access to lesson plans specially written to be used in conjunctions with the videos help not only to minimize lesson preparation time, but also help provide valuable additional learning activities and projects that further enhance the use of the video as an educational aid. Increases student motivation, enhances learning experience, higher

marks of development potential for deeper learning of the subject, development of learner autonomy, enhances team working and communication skills, a source of evidence relating to skills for interviews, learning resources for further cohorts to use.

Objectives of the Study

The present study has the following objectives:

1. To measure the level of impact of video-based instruction on academic achievement in biological science among secondary school students.
2. To find out the significant difference on the mean value towards the impact of video-based instruction on academic achievement in biological science with respect to gender and locality of secondary school students.

Hypotheses of the Study

The hypotheses for the present study which have been constructed are as following:

1. There is no significant difference in the pre-test academic achievement scores in biology among the secondary school students of control group and experimental group in total.
2. There is no significant difference in the post-test academic achievement scores in biology among the secondary school students of control group and experimental group in total.
3. There is no significant difference in the pre-test and post-test achievement scores in biology among the secondary school biology students of control group in relation to gender.
4. There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of control group and with respect to locality.
5. There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of experimental group with respect to gender.
6. There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of experimental group with respect to locality.

Sample

The investigator applied the refined random sampling technique. The sample is of 30 students and an experimental study was conducted on class ninth students of a secondary school in Aligarh district and using a pre-test and post-test equivalent group in experimental design.

Data Collection

A pre-test was conducted for both the control and experimental groups and the treatment through video-based lectures was given to the experimental group and conventional method of teaching to the control group for the selected content. At the end of the treatment a post-test was conducted on both control and experimental groups.

2. DATA ANALYSIS AND INTERPRETATION

Hypothesis 1: There is no significant difference in the pre-test scores in biology among the secondary school students of control group and experimental group in total.

Table 1: Significant difference in the pre-test achievement scores in biology on total sample

	Groups	N	Mean	SD	t-value
Total	Control	30	3.00	1.94	0.23**
	Experimental	30	3.00	1.96	

**Not significant at 0.05 level

From the above table 1, it is seen that the t-value of 0.23 is not significant at 0.05 levels. On observing the results, it is concluded that the pre-test achievement scores in biology of both control and experimental group students in total were similar. Hence, the framed null hypothesis is found to be accepted.

Hypothesis 2: There is no significant difference in the post-test academic achievement scores in biology among the secondary school students of control group and experimental group in total.

Table 2: Significant difference in the post-test achievement scores in biology in total

	Groups	N	Mean	SD	t-value
Total	Control	30	17.06	1.77	15.81*
	Experimental	30	26.13	2.64	

*Significant at 0.05 level

From the above table 2, it is seen that the t-value of 15.81 is significant at 0.05 level. On observing the results it is concluded that the post-test mean academic achievement scores in biology of the experimental group students in total is significantly higher than the control group students in total. Hence, the framed null hypothesis is rejected.

Hypothesis 3: There is no significant difference in the pre-test and post-test achievement scores in biology among the secondary school biology students of control group in relation to gender.

Table 3: Significant difference in the pre-test and post-test scores in biology among secondary school students of the control group with respect to gender

Gender	Groups	N	Mean	SD	t-value
Male	Pre-test	12	3.01	2.01	17.9*
	Post-test	12	17.05	1.79	
Female	Pre-test	18	3.55	1.93	19.96*
	Post-test	18	17.37	1.77	

*Significant at 0.05 level

On observing the table 3, it is seen that the t-values 17.9 and 19.96 are significant at 0.05 levels. It can be seen that the t-values 17.9 and 19.96 are significant at 0.05 level. It is therefore inferred from the results that the post-test mean academic achievement scores in biology of control group students are better than the pre-test mean academic achievement scores of control group students with regard to gender. Hence, the framed null hypothesis is found to be rejected.

Hypothesis 4: There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of control group with respect to locality.

Table 4: Significant difference in the pre-test and post-test scores in biology among secondary school students of the control group with respect to locality

Locality	Groups	N	Mean	SD	t-value
Rural	Pre-test	22	3.36	1.86	20.34*
	Post-test	22	17.36	1.89	
Urban	Pre-test	8	3.65	1.81	24.00*
	Post-test	8	26.07	0.13	

*Significant at 0.05 level

It can be seen from the above table 4, it is seen that the t-values 20.34 and 24.00 are significant at 0.05 level. On observing the results of the above table show that the post-test mean achievement scores of control group are better than the pre-test mean achievement scores of control group with respect to locality in biology. Hence the framed null hypothesis is found to be rejected.

Hypothesis 5: There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of experimental group with respect to gender.

Table 5: Significant difference in the pre-test and post-test scores in biology among secondary school students of the experimental group with respect to gender

Gender	Groups	N	Mean	SD	t-value
Male	Pre-test	21	3.45	1.95	33.48*
	Post-test	21	26.25	2.86	
Female	Pre-test	09	4.30	1.94	43.05*
	Post-test	09	26.50	2.27	

*Significant at 0.05 level

From the above table 5, it can be seen that the t-values 33.48 and 43.05 are significant at 0.05 level. It can be therefore inferred from the results that the post-test mean achievement scores in of experimental group are better than the pre-test mean achievement scores of experimental group students with regard to gender. Hence the framed null hypothesis stands rejected.

Hypothesis 6: There is no significant difference in the pre-test and post-test academic achievement scores in biology among the secondary school students of experimental group with respect to locality.

Table 6: Significant difference in the pre-test and post-test scores in biology among secondary school students of the experimental group with respect to locality

Gender	Groups	N	Mean	SD	t-value
Male	Pre-test	22	3.69	1.96	38.27*
	Post-test	22	26.26	2.97	
Female	Pre-test	8	3.85	2.11	28.11*
	Post-test	8	26.57	1.13	

*Significant at 0.05 level

From the above table 6, it can be noticed that the t-values 38.27 and 28.11 are significant at 0.05 level. It can be therefore inferred from the results that the post-test mean achievement scores in of experimental group are better than the pre-test mean achievement scores of experimental group students with regard to locality. Hence the framed null hypothesis stands rejected.

3. RECOMMENDATIONS

The recommendations for the present study are as following:

1. Steps must be taken by appropriate authorities to train the teachers of biology on the application of Information Communication Technology facilities like video-based instruction so as to maximize the learning of biology by the secondary school students.
2. Efforts must be made to include advance concept like video-based classroom instruction in the B.Ed as well as in the M.Ed curriculum.

4. CONCLUSION

If a teacher is able to teach in one of the content areas in which there are clips and guidelines ready to use and many of those educational clips are on the survey top forty, one would be able to make his or her classroom teaching learning process very interesting and enthusiastic. Every teacher has to decide that how he or she is able to use those clips and where and when to embed them. If one is teaching in other disciplines, then start with the top 40 and begin extracting the clips one wants. Draw on every one's creativity, imagination, and artistic gifts in applying these clips and those of our own choosing to our teaching. Teaching of biological science needs the support of Video-based instruction but sometimes it becomes very essential if science like biology is taught without Video-based instruction, that will be useless at all levels.

From the analysis and data interpretation it was found that the pre-test academic achievement scores in biology of both the control and experimental group students were similar. The post-test mean academic achievement scores in biology of the experimental group students is higher than the control group students on total sample and the post-test mean academic achievement scores in biology of control and experimental group students are better than the pre-test mean academic achievement scores of control and experimental group students with regard to gender and locality.

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