

Video Instructional Material (VIM) Integrated Teaching & Learning in Science at Secondary Level

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ABSTRACT

The present study is carried out to examine the effectiveness of Video Instructional Material (VIM) on secondary level students' achievement in science at knowledge, understanding and application level and their attitude towards VIM in Wardha district of Maharashtra, India. This research is based on pre-test and post-test single group experimental design. In this study, one secondary school was selected using simple random sampling technique. All 40 students of class 9th of that school were included in the experimental group for conducting the experiment. Lesson plans of science were developed by the researcher using VIM. For data collection, self-made Science Achievement Test (SAT) and self-made Attitude Scale towards Video Instructional Material (ASVIM) were used. SAT comprised of 30 multiple choice questions of secondary school science at knowledge, understanding and application domain. The reliability coefficient value of SAT was 0.70 calculated by split-half method. ASVIM comprised of 20 statements. The pre-test of SAT was administrated on the group before starting the experiment. The next stage involved the treatment phase in which the researcher taught 2 chapters of science (Digestive System of Human and Air Pollution) to students with the help of lesson plans which were developed by researcher. When the treatment was over, post-test of SAT and ASVIM were administrated on the group. After collecting the data, the Shapiro-Wilk test was used for checking the normality of the data and then analysis of data was done by using both descriptive (Mean, Standard deviation) and inferential (t-test) statistics. A hypothesis was tested on 0.01 level of significance. After the analysis of data the findings of the study revealed that the students taught by the VIM performed better on Science Achievement Test at all three levels of the cognitive domain and students have positive attitude towards VIM. These findings indicate that the VIM was found to be significantly effective in terms of achievement in science. Therefore it can be concluded that the VIM is effective to learn science. Based on the result obtained, it is therefore recommended that teachers should use VIM for teaching science and other subjects at secondary level to facilitate learning of higher levels of cognition.

Keywords: Effectiveness, Video Instructional Material, Achievement in Science, Attitude towards Video Instructional Material.

I INTRODUCTION

In this 21st century, the term “technology” is an important issue in many fields including education. This is because technology has become the knowledge transfer highway in most countries (Nath & Srivastava, 2015). Technology integration nowadays has gone through innovations and transformed our societies that has totally changed the way people think, work and live (Hamidi, Meshkat, Rezaee, & Jafari, 2011). As part of this, schools and other educational institutions which are supposed to prepare students to live in “a knowledge society” need to consider ICT integration in their curriculum (Ghavifekr, Afshari & Amla Sallah, 2012).

Over the past two decades, Information Technology (IT) has broadened to become Information and Communication Technology (ICT), and has become better established within schools, colleges and universities (Abbott, 2001). ICT can play a major role in developing such a classroom environment and bringing in a paradigm shift in education practices across the world (Niederhausen & Stoddart, 2001). ICT based learning is filled with active and engaged learning. It inspires students to obtain a deeper knowledge gained through this method far more readily than through traditional textbook centered learning. In addition, students develop confidence

and self-direction as they move through both team-based and independent work (Cox and Marshall, 2007)

The importance of ICT is quite evident from the educational perspective. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability. (Shavinina, 2001). At the instructional level, computers are used by pupils to learn reading, mathematics, social studies, art, music, simulation and health practices (Tezci, 2011).

UNESCO (2002) highlights how the application of ICT could benefit the students, employers and the governments. While technology can bring about a learner centered Information Communication and Technology in Higher Education in India. It could also be harnessed for multiple purposes such as increasing the capacity and cost effectiveness of education and training systems and enhance the quality of higher education.

Video Instructional Material (VIM) is a systematic planned, skillfully arranged and effectively controlled video instruction for providing individualized instruction or learning experiences. The subject matter is logically sequenced into small segments. It is an application of the principles of behavioral science and technology in the field of education. In VIM concepts were made more comprehensive with

the help of daily life examples and pictures. Students were free to learn on the basis of their capacities. They may also clear his or her doubts by discussion with teacher after study through VIM (Sharma, 2013).

II LITERATURE REVIEWS

Ishika (2007) conducted a study entitled **Effectiveness of Video as an Instructional Medium in Teaching Rural Children Agricultural and Environmental Sciences**. The main aim of this study was to determine the effectiveness of video in comprise with selected instructional media for teaching primary school pupils agriculture and environmental sciences. The quasi pretest- posttest experimental research design was used in research. 240 pupils from 3 rural primary schools were selected with the help of purposive sampling technique for research. Self-made achievement test was used for data collection. T-test was used by researcher for analysis of data. After analysis of data, it was found that video is an effective as the traditional teacher in teaching primary school children agriculture and environmental issues.

Mendoza, Caranto & David (2015) conducted a research entitled **Effectiveness of Video Presentation to Student's learning**. This study was conducted to identify the effectiveness of video presentation to student's learning. 224 students of Benguet State University were included in this research. For data collection, self-made questionnaires were used. T-test, ANOVA were used for analysis of data with the help of SPSS version 20. After analysis of data researcher was found that video based study materials boosts student's creativity and cooperation. It was also found that there is no significance difference on student's perceptions of the effectiveness of video presentation to student's learning when grouped according to gender and there is a significance difference exists among student's perceptions of the effectiveness of video presentation when grouped according to their academic level. Furthermore, it was revealed that video based study materials can help motivate students and create learning-friendly environment to learn new concepts.

Effiong, Ekpo & Igiri (2015) conducted a research to determine the **Impact of Instructional Materials in Teaching and Learning of Biology in Senior Secondary Schools in Yokurr LG A**. 5 secondary schools were selected to study. Self-made questionnaires were used to data collection. After collection of data, it was analyzed through the use of frequencies and percentages. The result of the findings revealed that there is a positive achievement in students taught by highly qualified biology teachers and those exposed to instructional materials during lessons.

Idris, Shamsuddin, Arome & Aminue (2018) studied the **Use of audio-visual materials in teaching and learning of classification of living things among secondary school students in sabongari LGA of Kaduna State**. The main objective of this study was to identify the effectiveness of Audio- Visual aids on the academic achievement of secondary level students. 100 students were selected as sample with the help of purposive sampling technique. In this study quasi-experimental research design was used. Self-made Classification of Living Things Achievement Test (CLTAT) was used for data collection. T-test was used for data collection with the help of SPSS, 22 versions. After analysis of data it was found that there is unavailability of such materials in the study area and with a significant level of 0.001, it shows that using audio-visual aids in teaching classification of living things plays the role of enhancing academic performance.

III OBJECTIVES OF THE STUDY

The study was conducted with the following objectives-

- (a) To develop science lesson plans using Video Instructional Material.
- (b) To study, the effect of VIM on the student's achievement in science at secondary level.
- (c) To study, the attitude of students towards Video Instructional Material in Science.

IV HYPOTHESIS

The following were the hypothesis of the present study-

H₀ There is no significant difference in the mean scores of pre-test and post-test of achievement in science of secondary level students taught through the Video Instructional Material.

H₁ The students have positive attitude towards Video Instructional Material.

V VARIABLES

In the present research following were the variables-

- (a) **Independent variable:** Independent variables the condition or characteristic that the experimenter manipulates or in his/ her attempt to ascertain their relationship to observed phenomenon. In the present study, method of Treatment acted as an independent variable. The treatment involved the Video Instructional Material.
- (b) **Dependent variable:** Dependent variable is an attribute or characteristic that is dependent on or influenced by the independent variable. The achievement in science of students taken as dependent variable. Which was measured twice before and after treatment for experimental group.

VI RESEARCH DESIGN

Present research was Experimental in nature. In this research Pre-test and Post-test single group experimental research design was used as research design.

(a) **Sample and Sampling-** In order to select the representative sample from the population, random sampling technique was used. In this study, Maharashtra State Board affiliated one secondary school from Wardha city was selected using simple random sampling technique and all the 40 students of 9th standard of that school were included in the experimental group for the research purpose.

(b) **Research tools of the Study-** In the present research, data were collected in respective of variables, namely, Achievement in Science and Attitude towards Video Instructional Material were assessed with the help of tools developed by the researcher.

(i) **Science Achievement Test (SAT):** Achievement of students in science was assessed with the help of Science Achievement Test (SAT) which was developed by the researcher and it was given to some of the experts for the establishment of face and content validity. Some indispensable modifications were done according to their suggestions. The preliminary try out for SAT was made on 120 students of 9th class of other schools. It has reliability coefficient value 0.70 calculated by split-half method. The SAT comprised of 30 multiple choice questions of secondary school science pertaining to knowledge, understanding and application level. There was no negative marking. For each correct response, the students were given 2 marks whereas in case of incorrect response, they were allotted 0 marks.

(ii) **Attitude Scale towards Video Instructional Material (ASVIM):** Attitude of students towards Video

Instructional Material was assessed by Attitude Scale developed by the investigator. The scale comprised 20 statements (10 Positive statements and 10 Negative Statements). Against each statement five point (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) rating scale was quality given. In case of positive statement Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree were assessed weightages of 5, 4, 3, 2 and 1 while for negative statement it was 1, 2, 3, 4 and 5 respectively. Thus total scores ranges from 20 to 100. The score above 50 shows positive attitude.

VII STATISTICAL TECHNIQUES

The researcher used the Shapiro-Wilk test to check the normality of data after it the objective wise data analyzed in the following manner-

- (a) Correlated t-test was used for comparing mean scores of pre-test and post-test of achievement in science of secondary level students taught through the Video Instructional Material.
- (b) Mean, Standard deviation and Coefficient of Variation were used to study attitude of students taught through the Video Instructional Material in Science.

VIII PHASES OF THE STUDY

The present research involved three viable stages as pre-testing, treatment and post-testing stage. The earliest stage involved pre-testing of all the students on achievement. The next stage involved the treatment, in which the researcher taught 2 chapters of science (Digestive System and Air Pollution) to students with the help of lesson plans that were developed using Video Instructional Material. In last stage SAT was administrated as Post-test and ASVIM was also administrated on students to know attitude of students towards Video Instructional Material.

Table 1

First Stage	Second Stage	Third Stage
Administrated SAT as Pre-test	Taught 2 chapters of science (Digestive System and Air Pollution) to students with the help of lesson plans that were developed using Video Instructional Material. (For 14 working days and 45 minutes/ day)	1. Administrated SAT as Post-test. 2. Administrated ASVIM on students.

IX ANALYSIS AND INTERPRETATION OF DATA AND DISCUSSION OF RESULT

Before applying the appropriate statistics, the normality of the data was checked by the researcher with the help of Shapiro-Wilk test (Because $N < 50$). A schematic view of the result of Shapiro-Wilk test is presented in the following table-

Table 2

Achievement Scores	Shapiro-Wilk		
	Statistics	Df	Significance
Pre-test	0.928	40	0.004
Post-test	0.942	40	0.008

From the table number 02, it is evident that the Shapiro-Wilk test value for pre-test score of achievement is 0.928 whose probability of significance with $df=40$ is 0.004 which is less than 0.01 level of significance, hence not significant at 0.01 level of significance. Thus the null hypothesis that the distribution of pre-test scores of achievement does not deviate significantly from normality is accepted. Thus the distribution of pre scores of achievement is normally distributed.

The Shapiro-Wilk test value for post-test score of achievement is 0.942 whose probability of significance with $df=40$ is 0.008 which is less than 0.01 level of significance, hence not significant at 0.01 level of significance. Thus the null hypothesis that the distribution of post-test scores of achievement does not deviate significantly from

normality is accepted and hence the distribution of post-achievement scores is normally distributed.

(a) Comparison of mean scores of pre-test and post-test of achievement in science of secondary level students taught through the Video Instructional Material, parametric statistic i.e. correlated t-test was used for the analysis of data.

With the help of Shapiro-Wilk test it was proved that the data was normally distributed hence for Comparison of mean scores of pre-test and post-test of achievement in science of secondary level students taught through the Video Instructional Material, parametric statistic i.e. correlated t-test was used for the analysis of data.

Table 3

Mean, S.D., Correlation, df and t-value of Pre-Test and Post-Test Achievement Score of the Group

Group	Measurement	N	Mean	S.D.	R	Df	t-value	Sig. (2-tailed)
Selected Group	Pre-test	40	19.25	2.14	0.420	39	35.70	0.000
	Post-test	40	32.42	2.19				

From the table number 3, it is evident that the mean score of pre-test and post-test of the selected group are 19.25 and 32.42. Standard deviation (S.D.) of Pre-test and post-test of the group are 2.14 and 2.19. The value of r is 0.420. The t-value calculated from above two scores is 35.70 whose p value on two tailed is 0.000 which is less than 0.001, so it is significant at 0.01 level of significance. Therefore, the null hypothesis that there is no significant difference in the mean scores of pre-test and post-test of achievement in science of secondary level students taught through the Video Instructional Material. Hence, there is a significant difference between mean scores of pre-test and post-test of achievement in

science of secondary level students taught through the Video Instructional Material. Thereby it can be concluded that the Video Instructional Material is more effective for teaching science at secondary level.

(b) Attitude of students towards Video Instructional Material in Science.

The third object was to study the attitude of students towards Video Instructional Material in Science. The attitude towards VIM was assisted at the end of treatment. The data was analyzed with the help of Mean and Standard Deviation and Coefficient of Variation. The result is given in the following table-

Table 4

Group	Mean	Standard Deviation	Coefficient of Variation
Taught through Video Instructional Material	78.42	21.09	26.65%

From the table number 4, it is evident that the Mean score of Attitude towards Video Instructional Material was found to be 78.42. The Attitude Scale towards Video Instructional Material contained 20 statements related to different aspects of Video Instructional Material. Against each statement a five point scale was given on which students were to give their responses. Thus, the score of the students could range 20 and 100. The Mean score of ASVIM was towards 100 signifying strong positive. The Coefficient of Variation was found to be 26.65% which is quite low. It indicates that, as a group the Attitude towards Video Instructional Material were almost irrevocable and strong favorable. It may, therefore be concluded that the students have positive attitude towards Video Instructional Material.

X CONCLUSION

The present research on the Video Instructional Material reported indicates towards an overall positive outcome related to students learning in science. Video Instructional Material has several positive effects on student' knowledge content. Student performed better on assessment of science's content knowledge if they are taught with the help of Video Instructional Material. In summary, the present study indicate that the VIM had a positive effect on students' content knowledge of science and the development of skills such as collaboration, critical thinking and problem solving in real life situations.

XI DELIMITATIONS OF THE STUDY

Due to the constraint of time, resources and finance, this study is confined only to the Maharashtra State Board affiliated secondary schools in Wardha district of Maharashtra. The study is confined to only 40 students of class 9th of a single school. In this research only two chapters of science subject were taught.

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