ANIMATED VIDEO LECTURES AND STUDENTS ACHIEVEMENT AN EXPERIMENTAL APPROACH IN THE SUBJECT OF BIOLOGY

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Abstract- This experimental study was conducted to investigate the effectiveness of Animated Video Lectures on the academic achievement of Secondary School students in the subject of Biology. Research design for this experimental study comprised of "The Pretest- Posttest Equivalent Group Design". The main objectives of the study were: (i) To explore the relative effectiveness of animated videos on academic achievement of secondary school students. (ii) To find out the difference between treatment effect on low and high achievement students. Animated Video lectures downloaded through internet were presented on computer to facilitate the instruction. Video based materials boost student creativity and cooperation. Access to video can help motivate students and create a distinctive context for their learning experience. Forty (40) students of 9th Class of Government Centennial Model School (Boys) Mardan were randomly selected as sample of the study. Only the students of Biology were included in the sample. Both the groups were taught by routine methods of teaching. Pre-test, posttest and retention tests were administered as research instrument for the collection of the data. Mean, standard deviation and t-test were applied as statistical tools for finding out the significance of the results. It was concluded that the Animated Video Lectures facilitated the experimental group students by presenting the complex ideas in simple and understandable way. So the experimental group students performed better than the control group students due to treatment effects.

Keywords: Animated Video Lectures, School students, Biology

I. INTRODUCTION

We are living in "Scientific age" which have changed our way of living and has given us new civilization. In this era of scientific exploration the teacher of science must be equipped and skilled to initiate and stimulate his pupil's interest in the field of sciences (Johnson, 2016). Biology is the science of living world, how the world is organized, how it functions and what these functions are, how living things came into and how they respond to one another and with their environment. Digital media has become a part of students' daily life. Due to the continuous emergence of new technology, more and more students want to use electronic devices for learning. Digital media can be used to support learning activities in and out of school in both formal and informal situations (Cortada, 2020).

Video lecture is a need of 21st century learner over a decade age, teachers and leaders in education began to look at and develop a framework for what skills were necessary in the 21st century. To resolve the issue, the National Education Association (NEA) developed the Four C's, skills that technology on students Achievement every 21st century learner must have. These skills are collaboration, critical thinking, creativity, and communication. When teacher construct lessons, using technology as a tool, learning and as result student motivation increase. Today's learners are ready for collaboration, communication, creativity and critical thinking. The digital technology enables the teacher to teach new concepts which cannot be taught through traditional method (Faulkner, 2016).

OBJECTIVES OF THE STUDY

The main objectives of the study were

i.   To find out the relative effects of Animated Video Lectures on the performance of control group and experimental group students.

ii.   To explore the difference between treatment effects on the performance of low achievers and high achievers of control and experimental groups students.

HYPOTHESES OF THE STUDY

To achieve the objectives of the study the following null hypotheses were tested.

i. H_01:   There is no significant difference between the performance of control and experiment groups students on pre-test.

ii. H_02:   There is no significant difference between the mean scores of high achievers of control and experimental groups on pre-test.

iii. H_03:   There is no significant difference between the mean scores of low achievers of control and experimental groups on pre-test.

iv. H$_0$4: There is no significant difference between the performance of control and experimental group's students on posttest.

v. H$_0$5: There is no significant difference between the mean scores of high achievers of control and experimental groups on posttest.

vi. H$_0$6: There is no significant difference between the mean scores of low achievers of control and experimental groups on posttest.

SIGNIFICANCE OF THE STUDY

This experimental study is very significant for all science students, science teachers, researchers, educationists and curriculum designers. This study is also providing a base for future researchers to conduct this study for different classes in different subjects.

II. REVIEW OF LITERATURE

In today's fast world full of competition, education comes out to be a basic need and necessity of human being after clothing, food, and sheltering. Always Education is the first most solution to any kind of a drastic problem; it is the education which transforms good manners, customs and over all social human awareness against anything and mostly the issues like illiteracy, terrorism, injustice, corruption and much more evils. Education is the power of an individuals and basic need to each person. It is the only basic and foremost first procedure through which a demanding modification and progress in the society can be tackled into a great sort of effect (Miller-McLemore, 2019).

Education helps to transform the human dreams into actual supreme reality. One of the most significance advantages of the education is that it promotes to get the aims of human life. For example, some individuals desire to become wealthy while others ones desire to get famous. Effective and Right education with obligation always can cooperate to achieve the goals. For students obtaining professional and technical degree is the only method to get excels in various business works like as health, IT, engineering, agriculture, and accounting (Makridakis, 2017).

Appreciation of the impact of science and technology

Students must understand that the recent computer technology as a result from the scientific revolution impacted the vale and worth and the lifestyle and economic uplift by development in medical care, food, agricultural verities, knew that this impact might be the result of the consequences, extensive exploitation, increase cultural modifications, recognized that progress in computer technology needs rapid application (Kadir, 2011).

Video Lecture Approach

In this approach the teacher display animated videos through computer to explain the topics so animations help students to know and understand difficult and complex ideas more easily. Such a process not only helps to makes the concepts clear but also increases the student's retention power (Jovanovich, 2013).

The following traits will make video lectures more effective.

1. Easy to access and work anytime

With video lectures students can learn anywhere from their devices: laptops, tablets or smart phones.

2. Learn anywhere you want

Your learners will enjoy the process of learning whenever they want. They need Just to upload your video lectures online and send your students the required link.

3. Learning at an students pace

Teacher knows that each and every student has their own pace of learning. With the help of video lectures, all students can learn at their own pace, which will increases the results of e-Learning.

4. Many ways to utilize

Video lectures are greatly utilized in distance learning. However, teachers can also utilize them in their class teaching. Such an innovations approach to teaching will engage and encourage their student.

5. Easy to deliver

Teachers can give students with unlimited approaches to all learning resources by uploading video lectures to the Website. Alternatively, teachers can make a CD and to send teachers lecture through email.

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III.   METHOD AND PROCEDURE

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Population
Forty four thousand two hundred and twenty five (44225) Secondary school students studying biology in the Government High/Higher Secondary Schools of Khyber Pakhtunkhwa were constituted the population of the study (Govt of Khyber Pakhtunkhwa, 2020)

Sample

Forty (40) students of 9th class studying Biology in Government Centennial Model School (Boys) Mardan were randomly selected as sample of the study. A pre-test of fifty items in the subject of Biology was administered to the sample students. On the basis of pre-test score the sample students were equally divided into experimental and control groups by pair-random sampling technique. Each group contained twenty (20) students.

Research Instruments
The researcher with the consultation of the class teachers and expert constructed the pre-test and post-test for the study. The test items were based on the following four chapters selected for the study from the 9th Class biology (i) Cell and Tissue (ii) Cell Cycle (iii) Bio energetic (iv) Transport. These teacher made tests were used as research instruments of the study.

Data Collection
Data were collected through research instruments pre-test, post-test and retention test from the sample of the study.

Data Analysis Tool
Data collected through research instruments were carefully tabulated and analyzed by applying mean, standard deviation and t-test in the light of the objectives of the study.

Data Analysis and Interpretation

H01:   Mean scores of control and experimental groups do not significantly differ on pre-test.

Table 1: Comparison of control and experimental groups on Pre-test

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	20	19.5	4.18	38	0.05		2.04
Experimental	20	19	4.47			1.58	

Table 1 shows that the calculated value of t (t = 1.58) was less than the table value P(P = 2.04) at level of significance 0.05 showing no significant difference between the mean scores of control and experimental groups. Therefore, the null hypothesis "There is no significant difference between the mean scores of control and experimental groups on Pre-test" was accepted. So, both the groups could be treated as equal for the experiment.

H02:   Mean scores of high achieving students of control and experimental groups do not significantly differ on Pre-test.

Table 2: comparison of high achieving students of control and experimental groups on Pre-test

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	10	22.9	1.45	18	0.05	0.928 Not Significant	2.101
Experimental	10	22.5	1.26				

Table 2 reflects that the calculated value of t (t = 0.928) was less than the table value P (P = 2.101) at significance level 0.05 indicating no significant difference between the mean scores of high achieving students (HAS) of control and experimental groups on Pre-test.

Hence the null hypothesis "There is no significant difference between the mean scores of HAS of control and experimental groups on Pre-test" was accepted. So the HAS of both the groups could be considered as equal for treatment.

H03:   Mean scores of low achieving students of control and experimental groups do not significantly differ on Pre-test.

Table 3: Comparison of low achieving students of control and experimental groups on Pre-test

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	10	16.1	3.03	18	0.05		2.101

| | | | | | 0.56
Not
Significant | |
| Experimental | 10 | 15.5 | 3.65 | | | | |

Table 3 reveals that the calculated value of t (t = 0.56) was less than the table value P(P = 2.101) at significance level 0.05 proving that there was no significant difference between the mean scores of low achieving students of control and experimental groups on pre-test. Therefore, the null hypothesis "There is no significant difference between the mean scores of LAS of control and experimental groups on pre-test" was accepted. So the LAS of both the groups could be treated as equal for the study.

H04:   Mean scores of control and experimental groups do not differ significantly on post-test
Table 4: Comparison of control and experimental groups on post test

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	20	43.9	12.96				
Experimental	20	63.85	16.52	38	0.05	3.08 Significant	2.04

Table 4 indicates that the calculated value of t(t = 3.08) was greater than the table value P (P=2.04) showing significant difference between the mean scores of control and experimental groups on Post-test. Therefore the null hypothesis "There is no significant difference between the mean scores of control and experimental groups on Post-test" was rejected.

H05;   Mean scores of high achieving students of control and experimental groups do not significantly differ on post-test.
Table 5: comparison of HAS of control and experimental groups on Post-test.

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	10	54.7	7.09				
Experimental	11	76.09	8.80	19	0.05	6.11 Significant	2.09

Table 5 shows that the calculated value of t (t = 6.11) was greater than the table value P (P= 2..09) proving significant difference between the mean scores of HAS of control and experimental groups on post-test. Hence the null hypothesis "there is no significant difference between the mean scores of HAS of control and experimental groups not significantly differ on Post-test" was rejected.

H06; Mean scores of low achieving students of control and experimental groups do not significantly differ on post-test.
Table 6: Comparison of LAS of control and experimental groups on Post-test

Groups	N	Mean	SD	df	Sig-Level	t-value	P-value
Control	10	33.1	6.77				
Experimental	9	48.88	9.70	17	0.05	4.15 Significant	2.11

Table 6 gives information that the calculated value of t(t = 4.15) was greater than the table value P(P = 2.11) indicating significant difference in the mean scores of LAS of control and experimental groups on Post-test. Therefore, the null hypothesis "There is no significant difference between the mean scores of LAS of control and experimental groups do not significantly differ on Post-test" was rejected.

IV.   DISCUSSION

H01:   The statistical analysis of pre-test scores showed no significant difference between the mean scores of control and experimental groups, as calculated value of "t" (t= 1.58) was not statistically significant at 0.05 levels (Table 1). Therefore, the null hypothesis, "There is no significant difference between the mean scores of control and experimental groups on pre-test" was accepted and both the groups were considered as equal for the treatment.
H02: The difference between the mean scores of high achievers of control and experimental groups on pre-test was not statistically significant at 0.05 levels (Table 2). Therefore the null hypothesis "There is no

significant different between the mean scores of high achievers of control and experimental groups on pre-test" was accepted and the high achievers of both the groups were treated as equal for the study.

H_03: The calculated value of "t" (t = 0.56) was not significant at 0.05 level of significance showing no significant difference between the mean scores of low achieving students of control and experimental groups on pre-test (Table 3). Hence, the null hypothesis "There is no significant difference between the mean scores of low achieving student of control and experimental groups on pre-test" was accepted and the low achievers of both the groups were treated as equal for the experiment.

H_04: Table 4 indicates that the calculated value of t(t = 3.08) was greater than the table value P (P=2.04) showing significant difference between the mean scores of control and experimental groups on Post-test. Therefore the null hypothesis "There is no significant difference between the mean scores of control and experimental groups on Post-test" was rejected. These findings supported the findings of the studies conducted by Yousaf et al. (2014) stated that video based teaching improved the learning outcomes of the students.

H_05: Table 5 shows that the calculated value of t (t = 6.11) was greater than the table value P (P= 2..09) proving significant difference between the mean scores of HAS of control and experimental groups on post-test. Hence the null hypothesis "there is no significant difference between the mean scores of HAS of control and experimental groups not significantly differed on Post-test" was rejected. The results of this study confirmed the results of the studies conducted by Arias et al. (2011) reported that video lectures have positive effects on success of students.

H_06: The statistical analysis showed significant difference between the mean scores of low achievers of control and experimental groups on post-test at 0.05 level of significance. so the null hypothesis "There is no significant difference between the mean scores of low achievers of control and experimental groups on post-test" was rejected. Hence the low achievers of experimental group performed well.

V. Conclusion

The researcher has drawn the following conclusions on the basis of the findings of the study.
1.   As there was no significant difference in the performance of control and experimental groups students on pre-test so both the groups were treated as equal for the study.
2.   The high achieving students and low achieving students of control and experimental groups were found equal on pre-test. Therefore both the groups were considered equal for the treatment.
3.   The experimental group students showed better performance than the control group students due to the treatment effects. The Animated video lectures facilitated the experimental group by presenting the complex ideas with the help of motion films in an easy and understandable way.
4.   The treatment not only improved the performance of high achievers of experimental group but also helped the low achievers of that group. They achieved high scores as compared to control group students. So the Animated video lectures were equally effective and useful for high as well as low achievers of experimental group.

VI. Recommendations

Researcher made the following recommendations on the basis of the above conclusions:
1.   As Animated video lecture is an excellent method of exposing a variety of complicated concepts through motion films to the learners in an easy and understandable way. Hence it is strongly recommended that the teachers should expose Biology students to video based instructional strategies to make learning more active and effective.
2.   Main problem is the availability of instructional technologies in our institutions. Therefore, it is strongly recommended that multimedia, computer and internet facilities should be provided to all educational institutions on priority basis.
3.   The research shows that the use of video technologies as a teaching tool is rapidly increasing day by day. Therefore, it is strongly recommended that video technology should be introduced into the class rooms on priority basis to make the teaching learning process more effective.

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