

## Impact of e-learning integration along with traditional method of learning on students scholastic attainments in biology at secondary level

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**Abstract:** The aim of this research paper is to explore the impact of amalgamation of E-Learning method to the traditional method of teaching on the students' scholastic attainments in the subject of Biology at secondary level. The design selected for this experimental study was pre-test post-test equivalent group design. Mean, standard deviation and t-test were applied on the results for the purpose of analysis. The findings reveal that the integration E-Learning as a supplement to the traditional method improved the attainment of the students in Biology. The results confirmed that there was notable distinction between the effectiveness of traditional teaching method and introducing E-Learning as a supplement in teaching of Biology at secondary level. The study recommendation is that the instructors should be encouraged to employ new technologies as a learning tool in their teaching practice. Appropriate and well equipped computer labs with internet connection should be commenced at all secondary schools. In order to equip the teachers to handle new technologies, pre service training, workshops, seminars and in-service training should be arranged by the provincial government of Khyber Pakhtunkhwa.

**Key words:** E-Learning; Integration; Scholastic attainments; Supplement; Traditional Method

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### 1. Introduction

E-learning refers to electronic learning. Oye et al (2010) described that the knowledge obtain by Information and Communication Technology is known as E-Learning for instance radios, mobile phones, computers, internet, and televisions, and so on to improve learning experiences. The term E-learning is also adapted for learning online, computer assisted learning, multimedia learning, web-based training and the application of technology in the educational process.

In education system, integration of E-learning is acknowledged globally as an instrument to improve the practice of instruction and acquisition of knowledge. According to Collis (2008), E-Learning is an instrument of modern technology, which is an agent of change. This innovative approach has entirely changed the scenario of education. The technological revolution poses fabulous challenges to the educators to rethink their basic beliefs and to redesign education by applying technology in creative ways.

Faize and Dahar (2011) discussed that we are living in the age of scientific discoveries. We can easily see the influence and application of science in all over the world. The main objective of E-learning is to clarify the problems faced by the students in the science education, to improve their achievements and motivation. Furthermore, the purpose of E-

Learning is to reduce the undesirable influence of the rote-memory.

Baylor and Ritchie (2002) found that E-learning also helps teachers to bring about positive change in their teaching expertise, by equipping them with helping materials for teaching, for instance, videos, animated films and interactive software. Since there is an urgent need to improve the quality of education, it can also address the shortage of resources as well as science teachers. Majed (1996) asserted that by using E-learning technologies, the teacher can clarify concepts that would be difficult to explain verbally. E-learning delivers graphics, drawings, animation, music and sufficient resources. Thus E-learning technologies capture and sustain students' attention and curiosity during their lessons. Moreover, E-learning technologies help learners attain observational and listening skills that help in their understanding of difficult ideas.

Nerdel and Prechtel (2004) described that in order to cope with individual differences; E-Learning gave them opportunity to continue their progress at their own pace.

The application of E-Learning technologies has the potential to help the teachers explain scientific concepts clearly in their classrooms, which led to better understanding of the students about the concepts being taught. Aina (2013) stated that through computers a teacher can display human anatomy; internal structure of human and animal cells is possible to view. Software are developed which demonstrate the movements of viruses and bacteria's, the activities of these microorganisms

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cannot be understood or learnt without seeing them in action which if teacher were to bring them in classroom settings in order to demonstrate physically; the danger may arise to both teacher's and student's health.

In some part of the world, law is already promulgated against killing animals for investigational purposes and as an alternate of killing those animals' computer animation and models for students can be used in life science. In botany various plants, many animals in zoology and in entomology many insects can never be found in many parts of the world, however must be learnt by students; with the help of computer, all these are made available to students as if they are in real forms. Computers support students to visualize the objects that are impossible or difficult to view.

In the classroom environment when students practically observe the information presented to them they learn best. So as to make the students ready for learning it is essential to use an amalgamation of E-learning with traditional teaching methods and to create the stimulating and interactive classroom environment to the extent that possible.

In this connection an up-to-date way of learning is needed to be introduced in our traditional system of teaching and learning so that the scholastic attainments in science could be enhanced in all our institutions. The proposed study will examine the comparative effect of E-Learning incorporation with traditional method where the teacher uses only blackboard and text book as a learning tool.

### 1.1. Objectives of the study

1. To expose the helpful role of integrating E-Learning with the traditional method of learning on the students' attainments in Biology at Secondary Level.
2. To examine the effect of E-learning on the retention of students who were taught with integrating of E-learning videos and other helpful material along with conventional mode of teaching (experimental group), and those who were treated by the conventional modes of teaching (control group).

### 1.2. Hypothesis of the study

1. There is no substantial dissimilarity among the average marks of the two groups (experimental and control) on Post-test.
2. There is no substantial dissimilarity among the average marks of both the groups (experimental and control) on retention-test.

## 2. Research method and procedure

For this experimental study, pre and posttest equivalent control group design was believed to be

the most appropriate design. Table 1 is the symbolic representation of the design.

**Table 1:** Pre- and -post- test control set design

Groups	Pre-test	Treatment	Post test
A(n=36)	O1	E	O2
B(n=36)	O1	C	O2

### 2.1. Population and sample

The population of the study was 400 students of class 10<sup>th</sup> of Government Centennial Model School for Girls Bannu. In the light of research design, 72 students were randomly chosen as a sample of the study for experiment. Two equal groups were formed from the sample students i.e. the investigational group and the control group. Both the groups were equated on the basis of pre-test marks through random sampling procedure.

### 2.2. Instrument of the study

1. Post-test and retention-test on the selected first three chapters developed by researcher after a systematic review of the test construction techniques, meeting with subject specialist in the subject of Biology.
2. E-Learning as a supplement with related videos and other helping materials along with traditional teaching method to teach the experimental group.

### 2.3. Validity and reliability of instrument

For validity of instrument a pilot test was administered in another school's class 10<sup>th</sup> student's not taking part in the experiment, so as to identify the very easy and very complicated test items, after eradicating of those questions, the researcher than took the expert opinion of two experts of the Biology subject. Necessary modification was made in accordance with their expert analysis.

By using the Spearman-Brown Prophecy formula, the coefficient of reliability was determined by estimating reliability from the comparable halves of the posttest, which was found to be 0.75.

### 2.4. Data collection

For the duration of the trial two diverse treatment types were used. The control group was given customary direct teaching method whereas group under experiment was offered with oral lectures, subject related videos and MCQs with prompt result from internet through computers as treatment. The time-span of the trial period was 4 weeks. Also the same Biology teacher instructed both the groups to maintain the validity of the study. Subsequently at the end of treatment posttest was administer to estimate the attainment of the sample students. After the period of one month a retention-test was taken from both the groups to find out the retention level of both groups. The data taken from

pretest score was used to make comparable groups where posttest and retention-test marks were used to measure attainment of the students.

## 2.5. Data analysis

For the handling of data means, standard deviations and t test were worked out for each group. Significance difference between the mean score of both groups (investigational and control) on posttest, retention-test marks were checked at 0.05

**Table 2:** Comparison of the two Groups' mean scores related to the posttest

Group	No. of students	Mean	S.D	T-Value	Df	T-table value
Experimental	36	41.52	7.39	2.33	70	1.98
Control	36	36.5	9.09			

\*Significant at 0.05 level

Independent-sample t-test was used to compare the attainments of the students of both groups on post-test. The average marks of control group is 36.5 and SD=9.09 and that of experimental group is 41.52 and SD=7.39. There was noteworthy deviation at  $t(70) = 2.33$  which is larger than 1.98 (the table value) at 0.05 level. This establishes that the integrating of E-learning to the customary method of teaching have

level by applying t-test to examine the effect of treatment.

## 3. Results

The results on post-test of experimental and control groups are as under:

Ho1: There is no substantial dissimilarity between the attainments of both groups (controlled and experimental) on post-test.

optimistically influenced the performance of group under trial. Hence the null hypothesis, "there is no substantial dissimilarity among the average scores of investigational and control group on post-test", was discarded

Ho2: There is no substantial dissimilarity between the attainments of both groups (controlled and experimental) on retention-test.

**Table 3:** Comparison of the Two Groups' Mean Scores related to the retention test

Group	No. of students	Mean	S.D	T-Value	Df	T-table value
Experimental	36	38.81	8.30	3.04	70	1.98
Control	36	32.80	8.74			

\*Significant at 0.05 level

For the analysis of data independent-sample t-test was used. The mean score of control group is 32.80(SD =8.74) and the mean score of experimental group is 38.81(SD =8.30). A noteworthy effect was found  $t(70) = 3.04 > 1.98$ (the table value of t), Hence, the null hypothesis, "there is no substantial variation among the average scores of experimental and control group on retention test" is discarded; it shows that E-learning techniques have positive impacts on the memory of experimental group.

## 4. Findings

The following are the main findings as a result of analysis of data.

1. Independent-sample t-test was used to compare the attainments of the students of both groups on post-test. The average score of the group under trial ( $M=41.52$ ) was greater than that of control Group ( $M=36.5$ ) there exists a substantial dissimilarity among the average marks of both groups on posttest. There was also a notable variation at  $t(70) = 2.33$  which is better than 1.98 (the table value) at 0.05 level. This confirms the usefulness of E-learning integration to the routine method of teaching.
2. For data analysis, independent-sample t-test was applied. It is clear from the results that the performance of investigational group( $M = 38.81$ ) is better than the performance of control

group( $M = 32.80$ ) which shows that on retention test, experimental group perform better than the control group, showing that teaching with the help of E-learning assists student's retention.

## 5. Results and discussion

For the attainment of results quantitative research method was applied. Soon after collection of data descriptive and inferential statistics were applied. An outstanding transform was observed in the scholastic attainment of the students taught through conventional teaching method and integration of E-Learning as an enhancement (blended learning). The students who received E-Learning integration with usual routine method of instruction were executed superior than those students who were taught only through customary method.

On the basis of these findings in this study, the following conclusions were stressed:

Students who received E-Learning integration as an enhancement to the customary method of instruction in Biology got better score than the students who received customary method.

There exists a substantial variation in the retention of Biology students taught through integrating E-Learning as an enhancement to the customary method of instruction than those who

received only the conventional method of instruction.

The distinction in the marks is due to integration of E-Learning to conventional method of instruction, or else both groups have equal basic knowledge of Biology.

## 6. Outcome of the study

1. The study found that E-Learning integration as an enhancement produce positive effect on teaching and learning of Biology as compared to conventional method of teaching. It was therefore required that Biology teachers (science) should also incorporate E-Learning (ICT) to enhance scholastic attainments of the students.
2. Government should provide IT Labs in all high schools and alternative resources of electricity such as solar panels to schools for availability of electricity in order to take advantages from the new technologies.

Science teachers in particular and other teachers in general should provide regular training to successfully handle the latest technologies in the classrooms.

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