

# Effectiveness of Educational Technology in Strengthening Students' Academic Achievement in English at Secondary School Level in Kohat Division, Pakistan

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## **Abstract**

The purpose of this research study was to explore the effectiveness of educational technology in strengthening students' academic achievement in English at secondary school level. All the students at secondary school level in Kohat Division constituted the population of the study. The study was delimited to the students of Govt. High School Khurram (Karak). The study was further delimited to the students of 9th class. Forty students of 9th class were selected as sample. Sample students were divided into two groups i.e. control group and experimental group on the basis of pre-test. Each group was comprised of 20 students. The study was experimental in nature therefore pre-test and post-test research design was used as research instrument. Statistical tools i.e. the mean, standard deviation and differences of means were computed for each group. Significance of difference between the mean scores of both the experimental and control groups on the variable of pre-test and post test scores was tested at

0.05 level by applying t-test. After statistical analysis of the data, it was concluded that educational technology plays a vital role in strengthening students' academic achievement in English at secondary level. Educational technologies were found to be more effective and successful in teaching of English. The students of experimental group showed unexpected and excellent performance as compared to the students of control group. Based on findings, it was strongly recommended that availability of educational technologies should be ensured and utilized at secondary school level.

**Keywords:** Effectiveness, Educational Technology, Students' Academic Achievement, English, Secondary Level

### Introduction

In the most of the advanced and developed countries, educational technologies are utilized efficiently and dynamically to strengthen and facilitate instructional process. But unfortunately, in the most of the developing countries as well as in Pakistan educational technologies are not utilized effectively during instructional process. There are some reasons which are responsible for the unsatisfactory utilization of instructional materials. Lower quality and less quantity of educational technologies provided to schools is one of the reasons. Secondly, teachers are not trained properly for the effective utilization of education technologies for instructional process (Suleman, et al. 2011). Thirdly teachers are not interested in using educational technologies for the instructional process.

Educational Technology is an area of study, which facilitate human learning process through systematic identification, organization, development and utilization of learning resources and through the management of processes. It is not restricted to these processes but it also comprises of those people who execute these processes (Sharma & Sharma, 2006). Educational technology is complex, comprehensive and integrated process, which is involved in many things like, people, ideas, procedures, devices and organizations which are design for the assessment of problems. It is also comprised of other various processes i.e., devising, implementing, evaluating and managing solutions to those problems that involve in all aspects of human learning (AECT, 1977).

The current paper was specially designed to explore the effectiveness of educational technologies in strengthening students' achievement in subject of English at secondary school level. The findings of the study will definitely assist the teachers to be known of the usefulness of educational technologies in teaching learning process at secondary school level. In this way they will utilize educational technologies to strengthen and improve their teaching especially in subject of English.

### Review of Related Literature

No one can deny the importance of English in the present era. English is used as medium of communication in most of the countries. In Pakistan, English plays a remarkable role in the development of the nation as it is used as medium of instruction at all level of

education. According to Abbas and Asif (2012), in Pakistan English has got great importance and is used as an important language. It is commonly used as official language in government offices. In addition to this, it is the language of law and constitution. English is used as a medium of instruction in the majority of the Pakistani schools, colleges and universities. But unfortunately, in this advance era, our teachers have adopted traditional methods of teaching English and they do not use instructional materials in their teaching. There are many reasons for this unsatisfactory utilization of educational technologies. There is poor availability of educational technologies in our institutions which is the main barrier in the integration of technology for teaching learning process. Secondly, some technologies are available to some extent but they are only confined to storeroom. Thirdly, they do not know how to use technologies for instructional process as they are not trained for the effective utilization of educational technologies. In addition, infrastructure is not designed for the effective and successful integration of educational technologies. Hence it is right to say that our education is collapsing day by day. Quality of teaching is decreasing day by day. Therefore it is imperative for policy makers and educationists to introduce and implement technologies based teaching learning process to make it more effective and successful.

The concept of educational technology has moved across three phases of development. In 1967, it was termed as audio visual aids. It was acknowledged as methods material and techniques till 1975. Then it was referred as system analysis by 1978. Therefore, managers of educational technologies moved from technicians to specialists and then to groups. At the first stage, the objectives were limited to technical and practical skills. At the second stage, these objectives were restricted to optimization of the teaching learning process via media. At the third stage, these were restricted to new attitudes and approaches (Rashid, 1998). Educational technologies play a crucial and remarkable role in strengthening teaching learning process. Educational technologies are those materials, procedures, organizations, ideas, devices, instruments or machines that facilitate teaching learning process and make it more effective, successful, and unforgettable (Suleman et al. 2011b). Tomei (2002) states that educational technologies are the combination of those instructional, developments, managerial and other technologies that are utilized particularly to explore the solution of educational problems. According to Venkataiah (1996), educational technology means to utilize different methods and techniques to design learning experiences systematically. Educational technology is considered as a tool of preparation and utilization of educational materials, improvement of curriculum, planning and organization of programs and proper application of knowledge (Rashid, 1998).

Research studies shows that teachers and students do not use technologies due to non-availability and inaccessibility of resources in schools (Suleman et al. 2011a; Veen, 1993; Byard, 1995, and Wild, 1996). Majority of our teachers apply traditional methods of teaching i.e. lecture method and the students are asked to learn the details of the given text. Majority of the teachers are worried about the examination system and syllabus coverage is the main anxiety of the teachers without evaluating the original capability and aptitude of the students. Teachers give importance only to reading and writing skills whereas listening and speaking

skills are disregarded. Our teachers only utilize traditional tools like black board and chalk. Some institutes have provided white boards and markers. Only a few modern teachers utilize cards, pictures, newspapers and other instructional materials related to the topic to equip their students. However, the main anxiety is to enable the students to learn the related materials so that they may become able to pass the examination easily. Instructional technology or instructional materials are not given its due importance i.e., Television, VCR, Tape recorder, internet, computer, overhead projector, multimedia etc. Although no one can deny from the usefulness of the said materials for the effective and successful teaching and may be poor availability is the main cause of unsatisfactory utilization of educational technologies for the instructional process. In addition, if technologies are available, then teachers hesitate to utilize it as they are not trained for handling technologies. Lack of administrative support is also the obstruction in the utilization of educational technologies as they do not allow them to utilize technologies due to fear of damaging and they have insufficient funds for their repairing (Abbas and Asif, 2012).

It is a reality that a nation can be developed and made prosperous if its educational system becomes effective. Education system can be made effective by the use of modern educational technologies. These technologies in education will be useful and effective if these are planned and organized properly on psychological, pedagogical principles, here and now enters in the educational technology (Sharma, 1993). Teaching learning process has greatly influenced by the rapid changes in technology. The aim of enhancing education quality creates the question of extent to which new technologies assist this process. It is recognized that traditional methods are not always effective and successful (Milliken and Barnes, 2002). According to the COMSIS (1984) study, video technology can enhance traditional method of teaching; computer technology can bring a "revolution" in teaching because computers have the potential for allowing students to learn at their own speed in an extremely motivating and non-threatening environment. The main obstruction to the effective utilization of computers in the schools is the lack of instructionally and technologically sounds software and the lack of training in the use of computers. Educational technologies ensure student's participation in instructional process. It plays a remarkable role in motivating students for learning. It improves student's retention, enhances educational attainment and helps him in clarifying difficult concepts. Descy (1991-92) also found that by the use of technologies, students become more motivated to learn, to explore, remain interested and that is why their learning performance becomes effective and better. Effective integration of technology in instruction motivates student's interest in learning, enhances student's high level learning, such as problem-solving and complex reasoning skills and improves the students learning outputs (Lazarowitz, 2002; Lingnar, Hoppe and Mannhaupt, 2003).

### **Usefulness of Educational Technology**

According to Aggarwal (1995), educational technology plays an important role in strengthening teaching learning process. Usefulness of educational technologies in teaching learning process is given as under:

1. Educational technology helps in individualizing instruction by enabling individuals to use self-instructional programmes.
2. It plays a crucial role in improving teaching learning process. It enables us to use various enriched and motivating programmes through different media.
3. It assists in using a variety of valuable programmes designed and developed for a massive number of students. These programmes are taught through television, computers etc.
4. It has played a fundamental and crucial role in equalizing educational opportunities without taking into consideration the social, economic and geographical status of the students.
5. The learners, in-service personnel and vocational works are kept in touch with the latest material through television lessons and self-instructional programmed material, which is sent to them.

According to Rashid (1997) describes following objectives of educational technologies.

1. Educational technology plays a vital role in making the instructional process scientific, objective and interesting.
2. It is a continuous and dynamic process.
3. It causes an appreciable change in the behaviour of pupils and teachers.
4. It makes use of psychology, technology, science, art, audio visual aids and machines.
5. It stresses on the arrangement of evaluation techniques and the measurement of the learning teaching process.
6. It lays emphasis on the development of methodologies and techniques to effective and successful learning.
7. It organizes learning situations to attain objectives.

### **Statement of the Study**

The current paper was designed to assess the effectiveness of educational technologies in improving students' academic achievement in subject of English at secondary school level. Therefore, the statement of the problems was designed as *“Effectiveness of Educational Technology in Strengthening Student's Academic Achievement in English at Secondary School Level in Kohat Division, Pakistan”*.

### **Objectives of the Study**

The objectives of the study were:

1. to explore the effects of educational technology on the academic achievement of secondary school students in subject of English;
2. to examine whether the students can maintain the learning for a longer time when they taught through educational technology;
3. to suggest workable recommendations for successful integration of educational technologies at secondary school level

### Hypotheses of the Study

In order to achieve the above mentioned objectives of the study, the researchers designed the following three null hypotheses:

1. There is no significance difference between the mean score of the experimental and control group on pre-test.
2. There is no significance difference between the mean score of the experimental and control group on post-test.
3. There is no significance difference between the mean score of the experimental and control groups on retention test.

### Research Methodology

#### *Participants*

All the students studying in public institutions at secondary school level in Kohat Division constituted the population of the study. Forty students from class 9th of Government High School Khurram (Karak) were selected as sample through simple random sampling technique.

#### *Delimitations of the Study*

The study was delimited to the secondary school students of Government High School Khurram (Karak). The study was also delimited to the students of 9th class. Educational technology is a broad subject therefore it was not possible to cover all the technologies in this singly study. So the researchers concentrated only on those technologies which are commonly used i.e., computer, Multimedia, overhead projector, charts and tap player. The study was further delimited to the following units of English:

Units	Title of the Units	Units	Title of the Units
01	The Holy Prophet (S.A.W)	03	Wandering Entertainers of Pakistan
02	Hazrat Umar (R.A)	04	My Bank Account

#### *Research Design*

As the study was experimental type, therefore “Pre-test-Post-test Equivalent Groups Design” was used. According to this design, sample subjects are randomly allocated to experimental and control groups. This design is symbolically represented as under:

$$\begin{array}{ccccccc}
 \mathbf{R} & \mathbf{E} & = & \mathbf{O1} & \mathbf{T} & \mathbf{O2} \\
 \mathbf{R} & \mathbf{C} & = & \mathbf{O3} & & \mathbf{O4}
 \end{array}$$

Where

R = Randomly selected

E = Experimental Group

C = Control Group

O = Observation or Measurement

T = The experimental treatment

### ***Instrumentation***

It was an experimental study therefore pre-test and post-test technique was used as research instrument for data collection. To compare the performance of control and experimental groups, a question paper was prepared in the four units of English and then administered among the students of both groups before the treatment. In the same way, another paper was developed and administered among the students of both groups after treatment. These two question papers were used as a research instruments.

### ***Data Collection***

In order to collect data, the researchers administered a pre-test and then a post-test to the both groups. The principal researcher along with other two English teachers, administered pre-test and post-test. For this purpose, two question papers were developed covering the four units of English. In this way data was collected.

### ***Data Analysis***

For the statistical analysis of the data, raw scores were organized and presented in tabular form. Statistical tools i.e., mean, standard deviation and differences of means were computed for each group. Significance of difference between the mean scores of both experimental and control groups on the variable of pre-test and post-test scores was tested at 0.05 level by using t-test. The following formulae were used for the analysis of data:

### ***Mean Formula***

The following formula was applied to calculate mean of the data:

Mean of the data was calculated by the following formula:

$$\text{Mean} = \bar{X} = \frac{\sum fx}{\sum f}$$

Where

$$\bar{X} = \text{Mean} \quad X = \text{data} \quad f = \text{Frequencies}$$

### ***Standard Deviation Formula***

Standard Deviation of the data was calculated by the following formula:

$$SD = \sqrt{\frac{\sum X^2 - \frac{(\sum X)^2}{N}}{N - 1}}$$

Where N stands for Total no of frequencies/respondents

### ***T-Test Formula***

For t-test the following formula was used to find out the value of t:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{SS_1 + SS_2}{n_1 + n_2 - 2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Where

$$SS = \sum X^2 - \frac{(\sum X)^2}{N}$$

### ***Appointment of the Teachers for Experimentation***

In order to conduct experiment, two teachers having equal qualifications and equal teaching experience were appointed to teach the both groups. Selection of teachers for the treatment was a tiring and difficult situation for the researchers as equally qualified and experienced teachers were required for experimentation. After extraordinary efforts, the researchers succeeded in providing teachers having equal qualifications and experience. Their qualifications were M.A English and M.Ed.

### ***Training of Teacher in Using Educational Technologies***

Research studies have shown that majority of the teachers are not trained for the effective utilization of educational technologies in teaching learning process (Suleman, et al. 2011). Therefore, it was imperative to train the teacher for the effective utilization of educational technologies i.e., computer, multimedia, overhead projector, charts and tape player. For this purpose, one week training was given to the teacher teaching to experimental group.

### ***Analysis and Interpretation of Data***

The study was designed to explore the effectiveness of educational technologies in strengthening students' achievement at secondary school level in Kohat Division. The study was experimental type and sample was divided into two groups i.e. control group and experimental group on the basis of pre-test. During the experiment, educational technologies i.e., computer, multimedia, overhead projector, charts and tape players were used for the experimental group. The students of control group were taught through traditional method. This experiment was continued for six weeks. After the completion of the experiment, the principal researcher administered a post-test immediately in order to investigate whether students of experimental group have learnt well as compared to the students of control group or not. For this purpose the teachers made question paper covering the four units of English which were taught during experiment for the both groups. After two weeks, the principal researcher along with other two teachers again administered the same post-test with the minor changes in the series of the questions as a retention test to the students of both groups. In this way data was collected, organized, tabulated, analyzed and compared. The whole process is described as under:

**H<sub>0</sub>1: There is no significant different between the performance of control and**



experimental groups on pre-test.

**Table 1: Significance of difference between the mean scores on pre-test of control and experimental groups**

Groups	N	Mean	SD	SE <sub>D</sub> .	t-value	p-value
Experimental	20	72.5	1.52	0.5	<b>0.200</b>	0.843
Control	20	72.4	1.64			
<b>Non-Significant</b>	<b>df = 38</b>	<b>(p&gt;0.05)</b>		<b>table value of t at 0.05 =2.024</b>		

Table 1 indicates that the computed value of t was found to be 0.200 which is statistically non-significant ( $p>0.05$ ) as it is less than the critical table value of t at 0.05 level. Hence the null hypothesis that “There is no significant different between the performance of control and experimental groups on pre-test” is accepted. The means score values clearly show that the students of both groups showed equal performance on pre-test.

**Ho 2: There is no significant difference between the performance of the control and experimental groups on post-test.**

**Table 2: Significance of difference between the mean scores on post-test of control group and experimental group**

Groups	N	Mean	SD	SE <sub>D</sub> .	t-value	p-value
Experimental	20	91.1	1.36	0.5	<b>26.48*</b>	0.000
Control	20	78.8	1.57			
<b>*Significant</b>	<b>df = 38</b>	<b>(p&lt;0.05)</b>		<b>table value of t at 0.05 =2. 024</b>		

Table 2 depicts that the computed value of t is 26.48 which is statistically significant because it is greater than the critical table value of t at 0.05 level. Hence the null hypothesis that “There is no significant different between the performance of control and experimental groups on post-test” is rejected. It clearly shows that students of experimental group showed significantly excellent performance as compared to the control group on post-test.

**Ho 3: There is no significant difference between the performance of control and experimental groups on retention test.**

**Table 3: Significance of difference between the mean scores on retention test of control and experimental groups**

Groups	N	Mean	SD	SE <sub>D</sub> .	t-value	p-value
Experimental	20	90.0	1.67	0.58	<b>21.88*</b>	0.000
Control	20	77.4	1.96			
<b>*Significant</b>	<b>df = 38</b>	<b>(p&lt;0.05)</b>		<b>table value of t at 0.05 = 2.024</b>		

Table 3 shows that the calculated value of t was found to be 21.88 which is statistically significant ( $p < 0.05$ ) because it is greater than the critical table value of t at 0.05 level. Hence the null hypothesis that “There is no significant different between the performance of control and experimental groups on retention test” is rejected. The mean score values explicitly show that the students of experimental group showed significantly excellent performance as compared to the students of control group on retention test.

### Discussion

The study was designed to examine the effectiveness of educational technologies in strengthening students’ achievement at secondary school level in Kohat Division. The study was experimental in nature and sample was divided into two groups i.e. control group and experimental group on the basis of pre-test. During the experiment, educational technologies i.e., computer, multimedia, overhead projector, charts and tape players were used for the experimental group. The students of control group were taught through traditional method. This experiment was continued for six weeks. After the completion of the experiment, the principal researcher administered a post-test immediately in order to examine whether students of experimental group have learnt well as compared to the students of control group or not . For this purpose the teachers made question paper covering the four units of English which were taught during experiment for the both groups. After two weeks, the principal researcher along with other two teachers again administered the same post-test with the minor changes in the sequence of the questions as a retention test to the students of both groups. In this way data was collected, organized, tabulated, compared and analyzed.

Table 1 indicates that there is no significant difference between the mean scores of experimental and control group on pre-test. The calculated t-value was found to be 0.200 which is non-significant ( $p > 0.05$ ) at 0.05 level of confidence. Therefore it unambiguously shows that there is no significant difference between the performance of students of experimental (mean=72.5) and control group (mean=72.4) on pre-test. Thus it can be concluded that performance of students of experimental and control group was same on pre-test. Therefore, the null hypothesis “there is no significant difference between the performance of experimental and control group on pre-test” is accepted.

Table 2 shows significant difference between the mean scores of experimental and control group on post-test. The calculated t-value was found to be 26.48 which is significant ( $p < 0.05$ ) at 0.05 level of confidence. Therefore it clearly shows that there is significant difference between the performance of students of experimental and control group on post-test. Hence the result reveals that the students of experimental group (mean= 91.1) showed better

performance as compared to the students of control group (mean=78.8). Therefore, the null hypothesis “there is no significant difference between the performance of experimental and control group on post-test” is rejected.

Table 3 depicts significant difference between the mean scores of experimental and control group on retention test. The calculated t-value was found to be 21.88 which is significant ( $p < 0.05$ ) at 0.05 level of confidence. Thus it plainly indicates that there is significant difference between the performance of students of experimental and control group on retention test. Hence the result reveals that the students of experimental group (mean= 90.0) showed better performance as compared to the students of control group (mean=77.4). Thus the null hypothesis “there is no significant difference between the performance of experimental and control group on retention test” is rejected. The results of the study also revealed that students of experimental group were found more interested, attentive and motivated during the treatment. On the other hand, students of control group were found passive, tired and frustrated.

### **Conclusions**

In the light of statistical analysis and findings of the study, the following conclusions were drawn:

1. The study revealed that technology based teaching learning process is more effective and successful as compared to the traditional teaching method in subject of English. Students of experimental group showed better performance than the students of control group. Students of the experimental group were found more attentive, interested and motivated.
2. The study also exposed that retention of the students of experimental group was found much better than that of the students of control group. Furthermore, it was also explored that retention of the students of experimental group was found significantly better as a whole, for low achievers and for higher achievers.

### **Concluding Remarks**

In nutshell, educational technology plays a crucial role in strengthening and improving the academic achievement of the students in subject of English. Educational technologies were found more effective and successful in improving students' educational attainment. By the application of educational technologies, motivational and achievement levels of the students were increased. In short, educational technology is very effective and successful in teaching of English at secondary school level.

### **Recommendations**

Keeping in view the above conclusions, the researchers made the following recommendations:

1. As it was found that educational technologies play a fundamental role in strengthening and improving instructional process and aid in clarifying difficult concepts easily. Educational technology based teaching method enhances the

motivational level of the students and hence, it is strongly recommended that all the teachers should utilize technologies for instructional process regularly.

2. Availability of educational technologies in our institutions is the key problem. Most of the technologies are not available in our institutes. Therefore, it is strongly recommended that computers, multimedia, overhead projectors, educational television, radios, models, pictures, maps, charts, flip charts, film strips, educational software, flash cards etc should be provided to all schools on priority basis.
3. A special training programme may be introduced for the effective use of educational technologies. All the in-service teachers should be provided training opportunities to make them proficient in using technologies.
4. A compulsory subject regarding the preparation or utilization of technologies may be introduced in teacher training programmes at each level so that the teachers may be trained in the utilization of these technologies.
5. Alternate power supply should be provided to each school for the successful integration of technologies. For this purpose, power generators should be given to each school on the emergency basis.
6. Physical and technical infrastructure should be designed in such a way that technologies may be used effectively.
7. Special room should be constructed for keeping educational technologies.
8. A special staff should be appointed by the higher authority to check the utilization of technologies by the teachers in at secondary schools.
9. Special budget should be provided to each secondary school by the government to purchase technologies

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