

## Effectiveness Of Multimedia Based Courseware in Learning Biological Concepts Among Student-Teachers at Diploma in Elementary Education Level



### Education

**KEYWORDS :** Multimedia courseware, Learning, Biological concepts, Student-Teachers, Diploma in Elementary Education

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### ABSTRACT

*A single medium consisting of features of more than one medium is called multimedia computer. The multimedia lesson converts a lecture into more of a demonstration or slide show where the technology allows the teacher to stop, back-up, go forward or skip to another file of images as students ask questions. Hence it is non-linear and interactive in nature. Multimedia holds great promise in enhancing learning as well as in improving the quality of education. In this study the investigator attempted an experiment to find out how far the multimedia is effective on learning biology concepts among student teachers at Diploma level. Experimental method was employed with pre-test/post-test equivalent group design. The sampling technique employed is random sampling. Multimedia courseware prepared by Pebbles for IXth standard Biology (Tamilnadu State Board – Syllabus), Entry behaviour test and Achievement test were used as tools for the study. The results of the experimental study proved that learning through multimedia courseware is more effective than the traditional method. Multimedia courseware attracts the learner as they learn Biology concepts easily through a combination of video, audio and textual modes. As multimedia courseware is one of the best suitable methods, this may be included as a part of teaching learning process in all educational institutions.*

### INTRODUCTION

Effective pedagogy is the one which provides knowledge for learners by enhancing communication that promotes learning. As per the National Curriculum Framework of India – 2005, (NCF-2005) Multimedia Technology is introduced as pedagogy in Teacher Education Curriculum at Diploma level in Tamilnadu. By understanding the significance of Technology the scheme Sharva Shiksha Abhiyan (SSA) funded by Ministry of Human Resource Development (MHRD), New Delhi, provided multimedia resources like Computers, Laptops, Educational CD's to almost all the schools for the process of effective teaching learning. The smart school efforts of Government of Tamilnadu indicates that the government is serious to transform the education system from the traditional, rigid and teacher dependent methods to a more contemporary, interactive and autonomous learning approach. So, the schools all over the state are in urgent need of teachers who are capable and comfortable with advanced technologies to meet the learning needs of the students. In order to cope up with the technological revolution in the teaching-learning process, it is indispensable to incorporate the latest technologies in all classroom learning. Appropriate technology in the hands of competent teachers can ensure a better teaching-learning process. The review of literature reveals that the multimedia courseware is one of the very effective pedagogy which stimulate the interest of learners and motivate them to acquire knowledge and skills. Non-availability of appropriate multimedia courseware to learn biology concepts of the respective standards demands the involvement of Teacher Educators in the production of such courseware. Hence, keeping all these points in view, the Investigator attempted an experiment to study the effectiveness of multimedia based courseware on learning biological concepts among student teachers at Diploma level.

### TERMS AND DEFINITIONS

**Multimedia courseware** - refers to specific practices of media combination used to accomplish the objectives of teaching by means of deliberate arrangement of experience(s) to help student to achieve a desirable change in performance. In this study the various media used were text, audio, video, graphics and animations.

**Learning** - Learning is the act, process, or experience of gaining knowledge or skill.

**Biological Concepts** - Ideas related to scientific study of life and structure of plants and animals.

**Student Teachers** - a person studying to be a teacher and who, as part of the training observes classroom instruction or does

closely supervised teaching in an elementary or secondary school. After completing 12 years of school studies the students are eligible to join D.EL.Ed course in DIET. In this study student teachers refers to those who studied second year of Diploma in Elementary Education in the DIET, Uthamapalayam, Theni District in 2012 – 2013.

**Diploma in Elementary Education** - Two-Year Elementary Teacher Education programme after the completion of Class XII.

### OBJECTIVES OF THE STUDY

1. To find out whether there is any significant difference between pre-test and post-test mean values of the control group.
2. To find out whether there is any significant difference between pre-test and post-test mean values of the experimental group.
3. To find out whether there is any significant difference between post-test mean values of the control group and experimental group

### HYPOTHESES OF THE STUDY

1. There is a significant difference between experimental group and control group in the pre-test performance in achievement in Biology.
2. There is a significant difference between the pre-test and post-test mean scores of the control group with reference to achievement.
3. There is a significant difference between the pre-test and post-test mean scores of the experimental group with reference to achievement.
4. There is a significant difference between post-test scores of control group and experimental group with reference to achievement.

### METHODOLOGY IN BRIEF

Method : Experiment.  
Design : Equivalent group.  
Sampling: Random sampling method.

### SAMPLE FOR PILOT STUDY

The sample for the pilot study which consists of 50 second year student teachers from Thiravium Teacher Training Institute situated in Theni District of Tamilnadu.

### SAMPLE FOR FINAL STUDY

The sample for the final study which consists of 40 second year student teachers from District Institute of Education and Training situated in Uthamapalayam, Theni District of Tamilnadu.

**TOOLS USED**

1. Multimedia Courseware prepared by Pebbles for IX<sup>th</sup> standard Biology (Tamilnadu State Board – Syllabus)
2. Entry Behaviour test.
3. Achievement test.

**PROCEDURE**

The sequential phases of operation of the study were as follows.

- ❖ An Entry behavior test was administered to the whole sample and based on the analysis of results, Control and Experimental groups were formed by employing matching technique.
- ❖ Different programmes for experimenting the control group and the experimental group were prepared.
- ❖ A pre-test was structured and administered to both the groups before instructions.
- ❖ The content i.e., 1) Human body Organ system and 2) Animal Kingdom was taught through traditional method to control group and multimedia courseware prepared by Pebbles was used to the experimental group.
- ❖ A post-test was administered to both the groups after instruction.

**STATISTICAL TREATMENT**

Descriptive analysis and ‘t’ – test for significance of difference between the means of small independent sample was applied.

**TABLE 1 : DESCRIPTIVE ANALYSIS OF ACHIEVEMENT SCORES OF BOTH CONTROL GROUP AND EXPERIMENTAL GROUP IN PRE-TEST.**

Group	N	Mean	S.D	C.V	Max. Score	Minimum Score	Mid value	Mean Difference
Control	20	17.55	3.22	18.35	40	0	20	0.22
Experimental	20	17.33	3.08	17.77	40	0	20	

The table 1 reveals that the mean and standard deviation of the achievement scores in the pre-test of the control group is found to be 17.55 and 3.22 respectively for N=20. The mean and standard deviation of the experimental group for the same pre-test is found to be 17.33 and 3.08 respectively for N=20. It is found that the mean achievement scores of both the control and the experimental group are below the mid value for the pre-test. Also the coefficient of variation for the pre-test of the control and experimental groups were found to be 18.35 and 17.77 respectively which reveals that the achievement is low for the groups. The mean difference of the experimental and control group is found to be 0.22 for the sample of 20 each, shows that both the control and experimental group are merely equal in their achievement. Therefore it is concluded that both experimental and control groups are identical.

**TABLE 2: DESCRIPTIVE ANALYSIS OF ACHIEVEMENT SCORES OF CONTROL GROUP POST-TEST AND EXPERIMENTAL GROUP IN POST-TEST**

Group	N	Mean	S.D	C.V	Max. Score	Minimum Score	Mid value	Mean Difference
Control	20	21.55	4.42	20.51	40	0	20	15.15
Experimental	20	36.7	5.63	15.34	40	0	20	

The table 2 reveals that the mean and standard deviation of control group in the post-test is 21.25 and 4.42 whereas for the experimental group is 36.7 and 5.63 for N=20 in post-test. This shows that the mean achievement scores of the experimental group is very high than the mid-value. Also the coefficient of variation for the post-test of the control group and the experimental groups are 20.51 and 15.34 respectively, which reveals that the achievement of the control group is low and it is highly improved in experimental group after the treatment of Multi-

media. The mean difference of the post-test of the control group and the experimental group is obtained as 15.15 for the sample of 20 each, indicates that the experimental group has scored higher in post-test than the control group. This shows that the Multimedia based courseware treatment improved the achievement of the experimental group.

**HYPOTHESIS VERIFICATION**

**Hypothesis 1**

There is a significant difference between experimental group and control group in the pre-test performance in achievement in Biology.

**Table 3. Pre-test performance (Control Group Vs Experimental)**

Group	N	Mean	S.D	Variance	‘t’	Level of Significance
Control	20	17.55	3.22	10.37	0.069	NS
Experimental	20	17.33	3.08	9.49		

df = 38       $t_{(0.10)} = 1.697$       NS – denotes not significant

The above Table 3 reveals that the calculated ‘t’ value 0.069 does not equal or exceeds the t critical value of 1.697 at 0.10 level at 38 degrees of freedom. So there is no significant difference between the student teachers of control and experimental groups on their pre-test performance. The above findings confirm the effectiveness of balancing between the two groups (Control and Experimental)

**Hypothesis 2**

There is a significant difference between the pre-test and post-test mean scores of the control group with reference to achievement.

**Table 4. Pre-test Vs Post-test (Control Group)**

Types of Tests	N	Mean	S.D	Variance	‘t’	Level of Significance
Pre-test	20	17.55	3.22	10.37	0.81	NS
Post-test	20	21.55	4.42	19.54		

df = 38       $t_{(0.10)} = 1.697$       NS – denotes not significant

The above Table 4 reveals that the calculated ‘t’ value 0.81 does not equal or exceeds the t critical value of 1.697 at 0.10 level at 38 degrees of freedom. So there is no significant difference between the student teachers of control group on their pre-test and post-test performance.

**Hypothesis 3**

There is a significant difference between the pre-test and post-test mean scores of the experimental group with reference to achievement.

**Table 5. Pre-test Vs Post-test (Experimental Group)**

Types of Tests	N	Mean	S.D	Variance	‘t’	Level of Significance
Pre-test	20	17.3	3.08	9.49	2.559	0.02
Post-test	20	36.7	5.63	31.7		

df = 38       $t_{(0.05)} = 2.021$        $t_{(0.02)} = 2.423$

The above Table 5 reveals that the calculated ‘t’ value 2.559 exceeds the t critical value of 2.423 at 0.02 level at 38 degrees of freedom. So there is a significant difference between the student teachers of control group on their pre-test and post-test performance.

**Hypothesis 4**

There is a significant difference between experimental group and control group in the Post-test performance in achievement in Biology.

**Table 6 . Post-test performance (Control Group Vs Experimental)**

Group	N	Mean	S.D	Variance	F	't'	Level of Significance
Control	20	21.55	4.42	19.54	1.62	1.819	0.1
Experimental	20	36.7	5.63	31.7			

df = 38

 $t_{(0.2)} = 1.303$  $t_{(0.1)} = 1.684$ 

The above Table 6 reveals that the calculated 't' value 1.819 exceeds the t critical value of 1.684 at 0.1 level at 38 degrees of freedom. So there is a significant difference between the student teachers of control group on their pre-test and post-test performance.

**IMPLICATION OF THE STUDY**

- The results of the experimental study proved that learning through multimedia courseware is more effective than the traditional method.

- Multimedia based courseware attracts the learner as they learn Biology concepts easily through a combination of video, audio and textual modes.
- As multimedia based courseware is one of the best suitable methods, this may be included as a part of teaching learning process in all educational institutions.

**CONCLUSION**

In traditional method the students are only passive learners. But multimedia courseware makes the students active and provides optimum opportunities to learn and retain various biology concepts. The present study is a modest endeavor to find out the effectiveness of learning concepts in Biology through multimedia based courseware among student teachers at Diploma level. This study proves that learning Biology concepts through multimedia based courseware has been more effective than traditional method.

**REFERENCE**

- Anandan, K. (1997) . Multimedia computer in education. New frontiers in education, Vol.XXVII, No.3, July-september 1997. | 2. Baylor, A., & Ritchie, D. (2000). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology – using classroom? Computer & Education, 39(1), 400-410. | 3. Best, John W. (1997). Research in education. New Delhi, Prentice Hall of India. | 4. Doerr H.M., & Thompson, T. (2004). Understanding Teacher Educators and their Pre-service Teachers through multimedia case studies of practice. Journal of Mathematics Teachers Education : Vol.7, No.3, 175-201. | 5. Kim, Minkyong. (1997) . Pre-Service elementary teacher's decision about teaching and attitude towards computer related technologies. Dissertation Abstracts International, Vol 158/03A. P 721. | 6. Kozma R.B. (1991). An investigation on learning with multimedia. Fifth survey of Educational research Abstract Vol.II, NCERT, New Delhi. | 7. Mujibul Hasam Siddiqui, (2009). Challenges of Educational Technology. New Delhi, APH Publishing Corporation. | 8. Privateer, P.M.(1999). Academic Technology and the future of Higher Education. The journal of Higher Education, 70(1), 60-79. | 9. Passi B.K., & Hemant Khandai, (2001). Professional Development and ICT in Education. New Delhi, APH Publishing Corporation. | 10. Sampath K et.al. (1990). Introduction to educational technology. New Delhi: Sterling Publishers. | 11. <http://www.unescobkk.org/education/ict/teachertraining/nextgen>