

## EFFECTIVENESS OF CONTEXT BASED TEACHING FOR ENHANCING ACHIEVEMENT IN BIOLOGY AMONG SECONDARY SCHOOL STUDENTS

**Dr. Bindu M.P\***

---

### ABSTRACT

*Our fast-paced society compels us to address education for the new millennium. "The way we have organized ourselves for education reform has little to do with the ways students learn." (Parnell, 1995) Parnell further states that, "recent studies on brain structure and function reinforce the contextual learning contention that connecting content and context application is not only helpful to learning, but essential for learning. In addition, studies in the area of intelligence and the development of theories of intelligence underscore the contextual learning emphasis that education be focused on the needs of the learner, not the needs of the teacher or the educational institution. Context based teaching derived from contextual teaching learning practices in education. The core idea of context based teaching and learning is mind seeks meaning in context and knowledge is subjective. Context gives meaning to the objects. Basic science achievement is essential for developing scientific interest and temperament among students. In this age of knowledge explosion science and its invention rule the world. Moreover knowledge explosion change our standard of living. But unfortunately we are forced to accept the world without logic, reasoning etc. Therefore from the school itself teacher tries build a platform in science helps the students to be a man with scientific temperament. The result revealed that context based teaching enhance students achievement in science.*

*Key Words: Context based teaching, Biology achievement*

---

### INTRODUCTION

Learning is a process that changes the way we interact with the world. We learn, we modify our behaviour in response to the learning and as a result our actions and performance change, usually for the better. The role of context is the most important aspect in Ebbinghaus' work. He found that human forget very quickly without context. All these experience gain from different context and context give meaning to the experience. Education makes an individual a real human being. It is an essential human virtue. Man becomes man through education. He learns something at every moment and on every day. Education equips the individual with social, moral, cultural and spiritual aspects and thus makes life progressive, cultured and civilized. According to Pestalozzi (cited in Amstrong D.G et.al, 1989) "Education is natural, harmonious and progressive development of man's innate power". Teaching-learning process is a means through which the teacher, learner, and the curriculum are organized in a systematic manner

to attain predetermined goals and objectives. The teaching-learning activities which are varied and complex have to be harmonized. These elements and activities include learners and their individual differences, the methods of teaching, the material to be taught, class room conditions, teaching devices and aids, questions and answering, assignments, thinking, enjoying, creating, practical skills, discussions and many others. If the teaching-learning process is effective, then the child is able to make the best use of things in the world around him. Teaching is both an art and science. Able teacher always find ways and means to improve their teaching techniques. With the change in time the teachers are asked to employ newer methods of teaching their pupils more effectively so that they must be able to cope with the demand of age.

It should be clear that pupil's growth is determined both in nature and the method bringing learners into contact with subject matter or other learning materials. To have his pupils learn, a teacher must do certain interesting things

---

\*Assistant Professor in Science Education, School of Pedagogical Science, Dharmasrila, Kannur University (Kerala)

in certain interesting ways. It is not enough for a teacher merely to know the subject matter for the purpose of teaching. For pupils to learn teacher must carefully plan the procedures he will use and the activities that the pupils will undergo and the teacher must use interesting methods and new strategies. Modern teaching-learning process assigns an important place for student activity. It calls for a child-centered approach. The most distinctive feature of modern society is its science-based technology which has been making a profound impact not only on the economic and political life of a country but also on its educational system. In a traditional society the aim of teaching-learning was the preservation of the accumulated stock of knowledge. But in the modern society, the main aim of teaching-learning is not acquisition of knowledge alone. It is the awakening of curiosity, the stimulation of creativity, the development of proper interests, attitudes and values and the building of essential skills such as independent study.

In the world today, science and technology have brought about many significant changes in the society. In the beginning of the present century, it was believed that teachers are born not made, with increasing knowledge about child psychology and advancement. To meet the changes, a teacher should adapt innovative teaching method. The purpose of the present study is to familiarize science teachers with a teaching method for teaching science through using Contexts. The Context based teaching method should be very good attention capturing and motivate the students. The context can reveal the truth or reality about the events, people, objects and incidents in an interesting way. Many research studies in education and cognitive science reveals that using contexts while teaching and learning will be useful in enhancing basic science achievement.

The contexts based teaching is generally recognized as a reasonable and desirable strategy to enhance student learning in science. Using several cognitive and learning theories together with various philosophical considerations, investigator identifies five distinct contexts that are important in engaging learners: the theoretical, practical, social, historical, and affective. Based on the above mentioned five

contexts, investigator developed lesson transcripts, named context based teaching. A context for learning refers to the setting in which the learning occurs or the situation any of which create a reason, purpose, or the focus for the learning. Traditionally, the context for learning for students has been alone in a chair at a desk in a classroom. However the context can be a river or stream that run through the community. Students working in group with engineers from a local plant can be engaged in collecting specimen and conducting experiments from water's purity, so they can submit a report to the company or the environmental protection agencies. Science, technology, society, and environment education, originated from the science technology and society movement in science education emphasize the teaching of scientific the teaching of scientific and technological development in their cultural, economic, social and political context. Students are encouraged to engage in issue pertaining to the impact of science on everyday life and make responsible decision about how to address such issues. This enables students to formulate their own thoughts, independently explore other opinions and have the confidence to voice their personal viewpoints. Teachers also need to cultivate safe, non-judgemental classroom environments and must also be careful not to impose their own values and beliefs on students.

#### OBJECTIVES OF THE STUDY

1. Prepare context based lesson transcript in Biology
2. To compare the mean pre-test scores of achievement in biology between Experimental and Control group.
3. To compare the mean post-test scores of achievement in biology between Experimental and Control group.
4. To test the significance difference in the pre-test & post-test scores of Achievement in Biology between the control group.
5. To test the significance difference in the pre-test & post-test of Basic Science Achievement in Biology between the Experimental group.
6. To compare the gain scores of Basic Science Achievement in Biology between Experimental and Control group.

**HYPOTHESES OF THE STUDY**

1. Significant difference exists in the mean pre-test scores of Achievement in Biology between experimental and control group.
2. Significant difference exists in the mean post-test scores of Science Achievement in Biology between experimental group and control group.
3. Significant difference exists in the pre-test and post-test of Science Achievement in Biology of Experimental group.
4. Significant difference exists in the pre-test & post-test scores of Achievement in Biology of control group.
5. Significant difference exists in the gain scores of Achievement in Biology between Experimental group and Control group.

**METHODOLOGY**

The present study was intended to find out the effectiveness of Context based teaching for enhancing Biology achievement among secondary school students. Method selected was experimental and design used for the study was pre-test and post-test non-equivalent group design. Sample for the study consisted of 64 secondary school students from (two division of VIII th std.)GHSS Koothuparamba from Kannur district. By using the lottery method one division was taken experimental and the other treated as control group. The experimental group was taught using lesson transcript based on Context based teaching and the control group with existing activity method of teaching. The effectiveness of Context based teaching was determined by administering the achievement test in Biology as pre-test and post-test to both the groups. The scores obtained in the test were subjected to as a test of difference between means.

**SAMPLE FOR THE STUDY**

Secondary school students

**TOOLS & TECHNIQUES**

Lesson transcript based on Context based teaching (Bindu,2015).  
Basic science Achievement test (Bindu,2016)

**STATISTICAL TECHNIQUES**

The following statistical techniques were used in the study as per its objectives

- Mean
- Standard deviation
- test of significance of difference 't' test

**ANALYSIS AND INTERPRETATION**

**Comparison of Mean pre-test scores of Achievement in Biology between control group and Experimental groups**

The pre-test scores of Experimental and Control groups were tabulated and then the mean and Standard deviation were calculated. The difference between the mean scores of the two groups was tested for significance by finding the critical ratio. The results of the test of significance are given in table 1.1

**Table: 1.1**  
**Data and result of significance of difference in the pre test scores of students in the Experimental and Control groups**

Groups	No of students	Mean	Standard deviation	critical ratio	Level of significance
Experimental	34	7.68	3.6	0.47	0.034
Control	30	7.87	3.4		

The obtained value of critical ratio is 0.47 which is less than the table value 2.0 at 0.05 level and 2.66 at 0.01 level of significance. Hence there exists no significant difference between the pre-test scores of two groups. The experimental and control groups are almost identical in biology achievement before the experiment.

**Comparison of Mean post-test scores of Achievement in biology between Experimental and Control group**

The post-test scores of Experimental and Control group were tabulated and then the mean and standard deviation were calculated. The difference between the Mean scores of the test of significance is given in table.1.2

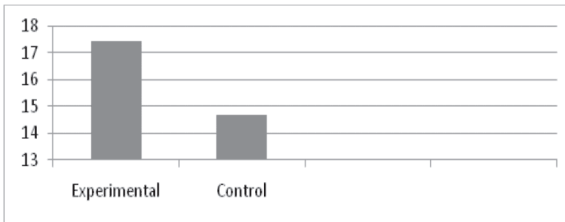
**Table 1.2**  
**Data and result of the significance of the post test scores of students in the experimental and control group**

Effectiveness of context based teaching for enhancing achievement in biology among secondary school students

Groups	No of students	Mean	Standard deviation	critical ratio	Level of significance
Experimental	34	17.45	3.65		
Control	30	14.68	4.01	5.68	0.05

The obtained value of critical ratio is 5.68 which is greater than the table. Hence there exists a significant difference between Mean post-test scores of the two groups. The Experimental group and Control group differ in the Biology achievement and Experimental group was better than the Control group. Result is given in graph. 1

**Graphical representation of comparison of Mean post-test scores of Biology achievement between Experimental and Control group is given in below in graph 1.1**  
Graph1.1



**Comparison of pre-test and post-test scores of students in experimental group**

The pre-test and post test scores of the experimental group were tabulated and then the Mean and Standard deviation for the scores were calculated in Control group for finding critical ratio. The result of the test of significance is given in table 1.3

**Data and result of the significance of the pre test and post test scores of students in the experimental group.**

Table 1.3

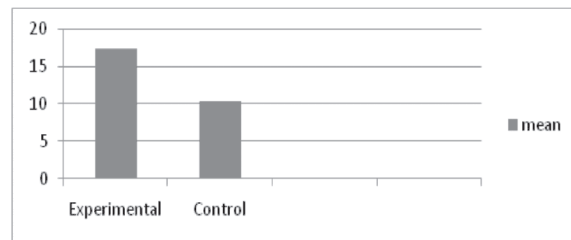
Groups	No of students	Mean	Standard deviation	critical ratio	Level of significance
Experimental	34	17.45	4.01		
Control	30	10.45	5.89	6.81	0.05

The obtained critical ratio 17.45 is greater than the table value at 0.05 level. Hence it is significant

at both 0.05 and 0.01 level. This shows that there is a significant difference between pre-test and post-test scores of the Experimental group. This is indicating that Biology achievement of students in Experimental group is higher than the biology achievement of students in control group after the experimentation. The Achievement in Experimental group is highly improved after experimentation. Data and result are represented in graph 1.2

Table 1.2

**Graphical representation of pre -test –post-test scores of experimental group**



**Comparison of gain scores of students in biology achievement between Control group and Experimental group**

Gain scores were obtained by calculating the difference in the post-test and pre-test scores of each student in the two groups. The gain scores were tabulated and the Mean and Standard deviation were calculated. The difference between two Mean scores was find out and tested for significance. The result obtained is given in table. 1.4

Table1.4

**Data and result of gain score of students in the experimental and Control group**

Groups	No of students	Mean	Standard deviation	critical ratio	Level of significance
Experimental	34	10.46	4.1	6.4	0.05
Control	30	5.2	3.95		

The obtained critical ratio is 6.4 which are greater than the table value, 2.0 at 0.05 level and 2.66 at 0.01 level of 54 degrees of freedom. Hence it is significant at both 0.05 and 0.01 level of significance. This shows that there is a significant difference between the mean gain scores of Experimental group is higher than the mean gain



scores of Control group. This shows that context based teaching method is more effective teaching method than existing activity method.

### **TENABILITY OF HYPOTHESES**

#### **Hypotheses I**

There will be a significant difference in the mean pre-test scores of biology achievement between Experimental and Control group.

The obtained critical ratio shows that both the groups do not differ significantly in the pre-test scores. Hence the null hypothesis is rejected.

#### **Hypotheses-II**

There will be a significant difference in the mean post-test scores of Biology achievement between Experimental and Control group.

Result revealed that Significant difference exists between the experimental and control group in mean post-test scores. Hence the second hypothesis is substantiated.

#### **Hypotheses-III**

There will be a significant difference in the mean pre-test & post-test scores of Biology achievement among Control group.

Significant difference was noticed in the mean pre-test, post-test scores of control group. Hence this hypothesis is substantiated.

#### **Hypotheses-IV**

There will be a significant difference in the pre-test & post-test scores of Biology achievement among Experimental group.

Significant difference was noticed in the mean pre-test, post-test scores of experimental group. Hence this hypothesis is substantiated.

#### **Hypotheses V**

There will be a significant difference in the gain scores of Biology achievement in physics between Experimental and Control group.

The difference in mean gain scores of experimental and control groups was found to be significant for the total sample. Thus the hypothesis is substantiated.

### **SUGGESTIONS AND CONCLUSION**

The findings arrived through the analysis of the data led the investigator to arrive at certain conclusions which are to be viewed in light of the

limitations of the study such as tool selected, sample chosen and time available for investigation. Context based teaching is one of the effective teaching method compare to existing method for enhancing Biology achievement. Importance of education is to create a more sustainable future and it holds the promise to gear up sound economic development on a sustainable basis. Education is a decisive factor in enabling people to become productive and responsible member of the society. Science education has a leading role in catalysing development. Investing in education is now globally regarded as one of the centrepieces of development. Science education is expected to provide the opportunity to acquire essential knowledge, skills and attitude required to function in the modern world. Science education emphasises the acquisition of skills and competencies for the productive application of acquired knowledge. Hence good science education is important for every child. What the future holds in store for human beings, the nation and the world depends largely on the wisdom with which science and technology is used and that, in turn depends on the character, distribution and effectiveness of the education that people receive (Rothkopf & Blaney,1991). Learning is an active process in which the individual seeks out information in relation to the task at hand and the environmental conditions prevailing at any given time, and tests out his or her own capabilities within the context formed by the task and the environment.

### **REFERENCES**

- Berns, R. G., & Erickson, P. M. (2001). Contextual teaching and learning: preparing students for the new economy. *The Highlight Zone: Research @ Work*, 5, 1–8. Retrieved from [http://www.cord.org/uploadedfiles/NCCTE\\_Highlight05ContextualTeachingLearning](http://www.cord.org/uploadedfiles/NCCTE_Highlight05ContextualTeachingLearning).
- Bond, L.P. (2004). Using contextual instruction to make abstract learning concrete. *ACTE: Techniques*. Retrieved from <http://acteonline.org>.

- Crawford, L. M. (2001). *Teaching contextually: Research, rationale, and techniques for improving student motivation and achievement*. Texas: CCI Publishing, Inc.
- Finkelstein, N.D.(2005). Learning physics in context: A study of students learning about electricity and magnetism. *International journal of science education*,27(10),118-1209
- Gallagher, S. A., Stepien, W. J., Sher, B. J., & Workman, D. (1995). Implementing problem based learning in science classrooms. *School Science and Mathematics*, 95, 136-146. <http://www.bgsu.edu/ctl>
- Ginsburg, H. P. (1997). *Entering the child's mind*. Cambridge, UK: Cambridge University Press. <http://www.bgsu.edu/ctl>.
- Greeno, J. G., A. Collins, and L. B. Resnick. 1996. "Cognition and Learning." In *Handbook of Educational Psychology*, ed. D. Berliner and R. Calfee. New York: Macmillan.
- Johnson, E. (2002). *Contextual teaching and learning*. Thousand Oaks, CA: Corwin Press <http://www.qsa.qld.edu.au/yrs11>
- <http://www.ed.gov/inits/teachers/exemplarypractices/context>
- [www.horizonshelp.org/contextual/contextual.htm](http://www.horizonshelp.org/contextual/contextual.htm)