# EFFECTIVENESS OF EDUCATIONAL SOFTWARE ON ACHIEVEMENT IN CHEMISTRY AMONG XI STANDARD STUDENTS

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***Abstract***

*The instruction through Educational Software has been making wonders in the class room activities. 'Eureka Educational Software' has developed Educational Software in the name of "Designmate" for different subjects such as Mathematics, Physics, Chemistry and Biology for the Standards from VI to XII. More animations and interactions are incorporated in this Software. The Investigator wanted to know, the effectiveness of the Eureka Educational Software on the Achievement in Chemistry. Hence the Investigators aimed to study the Effectiveness of Educational Software on Achievement in Chemistry among the Students of Standard XI. The study belongs to an Experimental Research. The sample of the study was selected based on the half – yearly performance of the students, they are divided into two groups. The total number of students 79, of which 37 belonged to Control Group and 42 belonged to Experimental Group. The developed Achievement Test in Chemistry by the Investigator was conducted before and after the treatment for both Control and Experiment Groups.*

***Key words :*** *Software, Effectiveness, Multimedia, Animation, Experimental.*

Computer Assisted Instruction (CAI) has emerged as an effective and efficient media of instruction in the advanced countries of the world. CAI is being used in the formal and non- formal educations at all levels. In India too computer has been introduced in most of the areas such as data processing, decision making, etc., It has impact on the working methods of research and development in the field of Science and Technology. First CAI attempt was made around 1961 when University of Illinosis produced Programmed Logic for Automatic Teaching Operation (PLATO). Hence, the use of computer in general education started from early sixties. The Computer Assisted or Aided Instruction may be defined as the use of computer as an integral part of an instructional system, the learner generally engaging in two – way interaction with the computer via terminal. "Designmate', is a Educational Software developed by Eureka Educational Software which is a 17 years old Multimedia Production House, involved into various activities like making of interactive presentation, animated films, music videos, special effects. They are the first people in India to do a full four minute animated music video where a live character interacts and dance with a computer generated character Anaida's" HooHallaHoo". They received an award for Best Animation from Autodesk. Eureka Educational Software developed 'Designmate', which were converting the entire textbooks into colourful 3D animated movies with interactive games and puzzles. This Education Software was distributed to Schools via Server and LAN. This Education Software covers Science and Mathematics subjects from class VI to XII.

**OBJECTIVES OF THE STUDY**

1. To find out the significant difference between the Pre -Test Scores of the Control and Experimental group.
2. To find out the significant difference between the Post - Test Scores of the Control and Experimental group.
3. To find out the significant difference between Control and Experimental group at the Pre – Test and Post – Test Scores.
4. To find out the effect of Educational Software on Achievement in Chemistry with respect to different variables such as of Gender, Caste and Science Marks secured in Standard X (SMSX).

**Method**

The present investigation was Experimental in nature.

**SAMPLE**

The investigators selected XI Standard Students of Periyar Centenary Memorial Matriculation Higher Secondary School, K.K. Nagar Trichy to carry out the Experiment because the School has been posed with well-equipped computer facilities. Based on the half – yearly performance of the Students, they are divided into two groups. The total number of students 79, of which 37 belonged to Control Group and 42 belonged to Experimental Group.

**Measures**

- Achievement test questionnaires were framed by

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the investigators with the guidance of the subject experts covering the following items such as Knowledge, Understanding, Application and Skill. These questionnaires were validated by Test – Retest method among the Student of XI Standard. The obtained 'r' value 0.74 shows that the tool is highly valuable. Thus the Validity and Reliability of the tool were established.

- The Eureka Educational Software was given to the Post Graduate Teachers who are handling Chemistry in the nearby schools for content validity. The opinion of them was highly satisfactory.

**Procedure :**

After the finalization of the tool, the investigators had given 40 items to the Students. Each item was in the form of multiple choices with an incomplete statement. For each item four alternative answers were given. Only one was the correct answer. The Students were requested to write the response in the form of correct alpha bate a, b, c and d. Each × responses carry 1 mark. The developed Achievement Test in Chemistry was conducted before and after the treatment for both Control and Experiment Groups. The Investigators taught Chemistry through Educational Software to the Experimental Group. Similar topics in Chemistry were taught through Lecture Method to the Control Group.

**Results and Discussion**

Mean and SD were calculated for each Variables to calculate't' values which is the test of significance of the difference between two means. The following tables contained the data regarding the Control group and Experimental group with the following variables such as Gender, Caste and SMSX.

***Table 1 :***

*Mean and SD of the Student towards Achievement Score for different Category of Control Group.*

| S.No | Variable | Category | Sample Size | Mean | | SD | |
|---|---|---|---|---|---|---|---|
| | | | | Pre-Test | Post-Test | Pre-Test | Post-Test |
| 01. | Gender | Boys | 18 | 20.83 | 65.97 | 9.09 | 13.31 |
| | | Girls | 19 | 15.53 | 62.5 | 12.05 | 17.37 |
| 02. | Caste | OC/BC | 23 | 22.07 | 65.43 | 11.48 | 16.57 |
| | | MBC/SC/ST | 14 | 11.61 | 62.14 | 6.09 | 13.69 |
| 03. | SMSX | Above 70% | 21 | 21.55 | 68.21 | 10.73 | 11.34 |
| | | Below 70% | 16 | 13.59 | 62.66 | 9.72 | 16.31 |
| 04. | | Total | 37 | 18.11 | 64.19 | 11.03 | 15.63 |

From the above table1 it is revealed that the average Mean Score of the Student towards Achievement Score for different category is 18.11 at Pre-Test level and 64.19 at Post-Test level which show the effectiveness of Lecture Method. Moreover at the Pre-Test level the minimum score is 11.61 and the maximum score is 22.07. At the Post-Test level 62.14 is the minimum score and 68.21 is the maximum score.

***Table 2 :***

*Mean and SD of the Student towards Achievement Score for different Category of Experimental Group.*

| S.No | Variable | Category | Sample Size | Mean | | SD | |
|---|---|---|---|---|---|---|---|
| | | | | Pre-Test | Post-Test | Pre-Test | Post-Test |
| 01. | Gender | Boys | 21 | 25.6 | 81.67 | 9.66 | 10.24 |
| | | Girls | 21 | 13.81 | 70.12 | 7.82 | 10.62 |
| 02. | Caste | OC/BC | 26 | 21.63 | 76.44 | 10.56 | 11.99 |
| | | MBC/SC/ST | 16 | 16.56 | 74.68 | 9.84 | 12.58 |
| 03. | SMSX | Above 70% | 18 | 18.89 | 78.89 | 10.28 | 9.33 |
| | | Below 70% | 24 | 19.9 | 73.65 | 11.24 | 13.11 |
| 04. | | Total | 42 | 19.70 | 75.89 | 15.63 | 11.93 |

Above table2 shows that the average Mean Score of the Student towards Achievement Score for different category is 19.70 at Pre-Test level and 75.89 at Post-Test level which show the Eureka Educational Software has considerable effect in Teaching Chemistry. Moreover at the Pre-Test level the minimum score is 13.81 and the maximum score is 25.6. At the Post -Test level 70.12 is the minimum score and 81.67 is the maximum score.

***Table 3** : Significant Difference between the Mean scores of Control Group and Experimental Group at Pre -Test level.*

| Group | N | Mean | SD | t value |
|---|---|---|---|---|
| Control | 37 | 18.11 | 11.03 | 0.661 |
| Experimental | 42 | 19.70 | 10.58 | |

The above table 3 reveals that the obtained mean Student Achievement Scores in Chemistry of the Control group and Experimental group are more or less same. The calculated't' value also indicates there is no significant difference between Control group and Experimental group at Pre-Test level. Hence the Null Hypothesis : There is no significant difference between the mean Student Achievement Scores in Chemistry of the Control group and Experimental group at the Pre-Test level is accepted.

***Table 4 :** Significant Difference between the Mean scores of Control Group and Experimental Group at Post-Test level.*

| Group | N | Mean | SD | t value |
|---|---|---|---|---|
| Control | 37 | 64.19 | 15.63 | 4.01** |
| Experimental | 42 | 75.89 | 11.93 | |

**Significant at .01 level

It is evident from the table 4 that the obtained mean value of Experimental group is greater than the control group. The calculated't' value shows that there is significant difference between the Control group and Experimental group. Hence the Null hypothesis: There is no significant difference between Student Achievement Scores in Chemistry of Control group and Experimental group at Post-Test level is rejected.

***Table 5 :** Influence of various Category over the performance of the Control Group and Experimental Group at Pre- Test level.*

| Category | Group | N | Mean | SD | t value |
|---|---|---|---|---|---|
| **Boys** | Control | 18 | 20.83 | 9.09 | 1.59 |
| | Experimental | 21 | 25.6 | 9.66 | |
| **Girls** | Control | 19 | 15.53 | 12.05 | 0.54 |
| | Experimental | 21 | 13.81 | 7.82 | |
| **OC/BC** | Control | 23 | 22.07 | 11.48 | 0.14 |
| | Experimental | 26 | 21.63 | 10.56 | |
| **MBC/SC/ST** | Control | 14 | 11.61 | 6.09 | 1.68 |
| | Experimental | 16 | 16.56 | 9.84 | |
| **Above 70%** | Control | 21 | 21.55 | 10.73 | 0.78 |
| | Experimental | 18 | 18.89 | 10.28 | |
| **Below 70%** | Control | 16 | 13.59 | 9.72 | 1.88 |
| | Experimental | 24 | 19.9 | 11.24 | |

The above table 5 shows that the calculated 't' values of Control group and Experimental group at the Pre-Test level at various Categories has no significant difference. Hence it is concluded that Gender, Caste, SMSX has no influence over the performance of Control group and Experimental group at the Pre-Test level. Therefore the Null hypothesis : There is no influence of Gender, Caste, SMSX over the performance of Student Achievement Scores in Chemistry of the Control group and Experimental group at the Pre-Test is accepted.

***Table 6 :*** *Significant Difference between the Mean scores of Pre- Test and Post -Test for Control Group.*

| Test | N | Mean | SD | t value |
|---|---|---|---|---|
| Pre | 37 | 18.11 | 11.03 | 14.62** |
| Post | 37 | 64.19 | 15.63 | |

**Significant at .01 level

It is evident from the table 6 that there is significant difference between the Pre-Test and Post-Test conducted for the Control group with calculated t value 14.62. Hence the Null hypothesis :There is no significant difference between Student Achievement Scores in Chemistry for the Pre-Test and Post-Test of Control group is rejected.

***Table 7 :*** *Significant Difference between the Mean scores of Pre-Test and Post-Test for Experimental Group.*

| Test | N | Mean | SD | t value |
|---|---|---|---|---|
| Pre | 42 | 19.70 | 10.58 | 22.61** |
| Post | 42 | 75.89 | 11.93 | |

**Significant at .01 level

The above table 7 reveals that the obtained mean Student Achievement Scores in Chemistry of the Post-Test is greater than Pre-Test of Experimental group. The calculated 't' value also indicates there is significant difference at .01 level between Pre-Test and Post-Test of Experimental group. Hence the stated Null Hypothesis is that, there is no significant difference between the mean Student Achievement Scores in Chemistry for the Pre-Test and Post – Test of Experimental group is rejected.

***Table 8 :*** *Influence of Gender over the performance of the Control Group and Experimental Group at Post – Test level.*

| Gender | Group | N | Mean | SD | t value |
|---|---|---|---|---|---|
| Boys | Control | 18 | 65.97 | 13.31 | 4.02** |
| | Experimental | 21 | 81.67 | 10.24 | |
| Girls | Control | 19 | 62.5 | 17.37 | 1.52 |
| | Experimental | 21 | 70.12 | 10.62 | |

The above table 8 shows that the calculated 't' values of Control group and Experimental group at the Post-Test level of the Boys has significant difference between the mean scores at .01 level. The above table also reveals that the calculated 't' values of Control group and Experimental group at the Post-Test level of the Girls has no significant difference between the mean scores. Therefore the Null hypothesis: Except Boys the Girls has no influence over the performance of Student Achievement Scores in Chemistry of the Control group and Experimental group at the Post-Test is accepted.

***Table 9 :*** *Influence of Caste over the performance of the Control Group and Experimental Group at Post-Test level.*

| Caste | Group | N | Mean | SD | 't' value |
|---|---|---|---|---|---|
| OC/BC | Control | 23 | 65.43 | 16.57 | 2.63** |
| | Experimental | 26 | 76.44 | 1.99 | |
| MBC/SC/ST | Control | 14 | 62.14 | 13.69 | 2.62** |
| | Experimental | 16 | 74.68 | 12.58 | |

**Significant at .01 level

The calculated 't' values from the above table 9 reveals that Control group and Experimental group at the Post-Test level of the Caste has significant difference between the mean scores at .01 level. The mean values of the above table shows that there is influence of caste over the performance of Control group and Experimental group at the Post-Test level. Hence the Null Hypothesis : There is influence of caste over the performance of Student Achievement Scores in Chemistry of the Control group and Experimental group at the Post-Test is rejected.

***Table10 :*** *Influence of Students secured Science Marks in Standard X over the performance of the Control Group and Experimental Group at Post-Test level.*

| SMSX | Group | N | Mean | SD | 't' value |
|---|---|---|---|---|---|
| Above 70% | Control | 21 | 68.21 | 11.34 | 3.43** |
| | Experimental | 18 | 78.89 | 9.33 | |
| Below 70% | Control | 16 | 62.66 | 16.31 | 2.45* |
| | Experimental | 24 | 73.65 | 13.11 | |

**Significant at .01 level
*Significant at .05 level

It is evident from the table 10 that the obtained mean value of Experimental group is greater than the Control group. The calculated 't' value shows that there is significant difference between the Control group and Experimental group at the Post-Test level with respect to SMSX. The mean values of the above table shows that there is influence of SMSX over the performance of Control group and Experimental group at the Post-Test level. Hence the Null Hypothesis : There is influence of SMSX over the performance of Student Achievement Scores in Chemistry of the Control group and Experimental group at the Post-Test is rejected.

**Conclusions**

Eureka Educational Software is more suitable method for teaching Chemistry at XI Standard level. Eureka Educational Software is the one of the best method in the Teaching Learning process of Chemistry for XI Standard Students without considering the individual variables such as Gender, Caste and SMSX this is due to the subject contents are taught through more animations and interactions. Due to this Educational Software Students concentrations increased and they easily understood the subject contents. At the Post-Test level the Girls shows no significant difference in the Achievement Scores in Chemistry of the Control group and Experimental group.

**REFERENCE**

Alpar & Kim, M. (2013).A microeconomic approach to the measurement of information technology value. *Journal of Management Information Systems, 7,* 55-69.

Bakos (2013). *Inter organizational information systems: Strategic opportunities for competition and cooperation.* MIT Sloan School of Management Ph.D. thesis, 2013.

Bakos & Treacy, M.E. (2012). *Information technology and corporate strategy: A research perspective*. *MIS Quarterly, 10*, 2.

Boehm (2010).Improving software productivity. *Computer, 20,* 43-57.

Krishnamoorthy, R.C., (2012). Educational technology expanding our vision. New Delhi : Authors press,.

Learning and Teaching Scotland (2003) *Early learning, forward thinking: The policy framework for ICT in early years.* Learning and Teaching Scotland, Dundee.

Mishra, R.C., (2013). Teaching of information technology. New Delhi: APH publishing corporation.

Siddiqui, M.H. (2010). Technology in higher education. New Delhi: APH publishing corporation.

Bhatia,R. (2012). ICT enabled teacher education. *University News* , 7 – 13.

Zaidi, S.M.( 2004). Educational technology. New Delhi: Anmol Publisher Pvt. Ltd.