ORIGINAL RESEARCH PAPER

Education

EFFECTIVENESS OF E-LEARNING STRATEGY ON THE ACHIEVEMENT OF THE SECONDARY SCHOOL STUDENTS IN PHYSICAL SCIENCE.

KEY WORDS:

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ABSTRACT

The present experimental study was undertaken with two objectives in view: (i) to apply E-learning strategy in teaching and learning of science at secondary level and (ii) to measure the effectiveness of e-learning strategy with special reference to various categories of students. Two matched groups of students were constituted for the purpose of this experiment. Each group consisted of 34 students. The control group was taught through the traditional lecture method while the experimental group learnt through e-learning strategy. The obtained results show that the e-learning strategy was more effective than the traditional lecture method in teaching and learning of Science at Secondary level and it enabled the below average students to cope with average students and above average students to a considerable extent. The methodology that was employed in this study was systematic random sampling for students under traditional study mode and purposive sampling in identification of students under the e-learning study mode. It is concluded that in order to improve teaching effectiveness and academic achievement, secondary education should consider aiming to develop e-learning teaching strategies that encourage greater engagement and also take into consideration the different learning styles found within the student body.

Introduction:

The progress of any country depends upon the quality of education offered and practices in vogue. Indian education, well known for its Gurukul System of Education in the Vedic Age, has undergone various phases and stages of development over a period of time since then. It has witnessed many ups and downs down the stream of its history. Despite all that, it has not only evinced concern for quality education but has also pioneered the cause of seeking excellence in education in its search for truth, goodness and beauty as a perennial issue of human life and education on per se..Recent developments in technology have changed the world outside as well as inside the classroom; making it quite eye-catching and interesting for the students to know and to learn. Developments in the application and dissemination of knowledge and information technology have had changing demands on education. The infusion of information and communication technology (ICT) into teaching and learning and for that matter into actual and virtual classroom has generated much interest in educational research in recent years. ICT have the potential of proving an alternative and more effective teaching and learning tool in education. Evidence emanating from research literature suggests that ICT has a powerful and significant impact on education both in terms of students' affective and cognitive outcomes in learning any subject of their choice. It has tended to make learning joyful and lasting in very many ways.

Need of the Study:

Piaget's (1973) revolutionary finding, "Every normal child is capable of learning physical science" has put greater responsibility on dispensers of mathematical knowledge and producers of knowledge of physical science education, To improve students' mathematical knowledge, different researches have been done and are being done in different areas, namely, content, method, evaluation, etc., providing evidence that difference in physical science achievement begins to appear at elementary level and perpetuates throughout the schooling years and that students have rarely understood physical science in its right perspective and meaning. Learning to think scientifically links help students to connect different aspects of physical science and construct rich in physical science representations to make their learning meaningful and effective. The literature review has shown that low achievers in physical science are a group that has been limited in developing mathematical understanding by a traditional physical science. Most physical science continues to be presented as a collection of facts and rules used to manipulate symbols, coverage of curriculum through textbooks lesson is still a priority and external representation and continue in the majority to be diagrams, tables, graphs, and world problems (Scott,2001).So, physical science remains a difficult and inaccessible subject to most students. This fact is not only accepted globally, but it is, consciously or unconsciously, being passed on from one generation to another.

The problem *of " drop-outs"* has increased now that "*physical science for all*" has come into fashion as a slogan.

The traditional classroom environment in physical science has been strongly oriented towards a syllabus-based delivery, using teacher control and textbook resources. In today's world, teachers need to be equipped not only with subject expertise and effective teaching methodologies but also with the capacity to assist students to meet demand of the emerging knowledge- based society with new forms of ICT and need to have the ability to use that technology to enhance learning.

Statement of the Problem: Effectiveness of E-learning strategy on the Achievement of the secondary school students in physical science.

In the present scientific and technological age, the conventional teaching methods are not sufficient to arouse interest among the students nor do they meet up to intellectual, psychological and emotional needs to the students in the new millennium.

Traditional methods of imparting knowledge such as lectures, books and conference papers are characterized by a linear progression of information. Human minds are more adaptable than this, using non -linear strategies for problem solving, representation and storage and retrieval of information. A digital society requires teachers who are "Digital Literate". Teachers must be multi-skilled in order to manage the multi-skill demands of a curriculum. Information and communication technology as a learning tool has enormous potentials. There is enough scope for learning,   to dynamically interact and collaborate with content, teachers learning resources to construct their own meaning.

Operational Definitions:

E-learning: E-learning is defined as learning opportunities delivered and facilitated by electronic gadgets.

Strategy: Strategy is defined as planning and directing a method for getting ahead in the work to achieve a long term or overall aim.

Achievement: Achievement is defined or attainment of best or highest grade or rank in examinations.

Physical science : Physical Science   is a branch of science which deals with a systematic explanation of various phenomena of non living matter, energy, and the physical properties of universe.

Independent variables --------   ICT-Used teaching
                              Traditional teaching
Dependent Variables -------- Achievement in Physical Science
                       Confidence level

Intervening variables: such as nature of school, grade level, subject to be taught, intelligence of pupils, socio-economic status of pupils, previous knowledge of pupils etc. were successfully controlled experimentally.

Objectives of the Study:
- To study the effect of ICT-used teaching on the students' achievement in Physical Science.
- To study the effect of traditional teaching on the students' achievement in Physical Science.
- To study the comparative effect of ICT-used teaching and traditional teaching on the students' achievement in Physical Science.
- To study the effect of ICT used teaching on the students' confidence level in answering the test questions in Physical Science.
- To study the effect of traditional method of teaching on the students' confidence level in answering the test questions in Physical Science.
- To study the comparative effect of ICT-used teaching and traditional method based teaching on the students' confidence level in answering the test questions in Physical Science.
- To study the relationship the significant difference between confidence level on control and experimental groups.

Hypotheses:
- There is no significant difference between pre test and post test mean scores of the students in control group taught in traditional method.
- There exists significant difference between the pre test and post test mean scores of the students in experimental group taught through E-learning strategy.
- There exists significant difference between the post test mean scores of the students in experimental group and control group.
- There exists no significant difference between confidence level of the students in control group.
- There exists significant difference between confidence level of the students in experimental group.
- There exists significant difference between confidence level of the students in control and experimental group.

De limitations of the study:
- The study is restricted to the Hyderabad district only.
- The study is restricted to 34 students of Suprabhat model high school, Nacharam, Hyderabad.
- The study is restricted to research study on Physical Science subject only.

Design of the study:
In the present study, students in the experimental group were taught using a power point program saved to CD-ROM. The power point presentation included animated, video clips. Students in the traditional group were taught using a chalkboard, textbooks, models and charts. Experimental classes housed a ceiling-mounted LCD projector that was connected to a computer and classroom projector projected onto an interactive whiteboard. The power point presentation was presented on a ceiling mounted LCD projector. The presentation expanded each lesson by providing extra examples and examples from the homework. Students were able to solve example problems and then instantly see the answer on a large screen in the classroom. This presented them immediate feedback.

In the present study, pre-test post-test experimental design was employed with a purposive sample in the form of intact sections of class VIII of the same school.

The study included a control group (34 students) and an experimental group (34 students). The experimental group was taught through E-learning used teaching and the control group through traditional method. The intact sections were equated on intelligence and socio-economic status.

The study involved three operational stages as identification stage,

treatment stage and post-testing stage. The first stage involved pre-testing of all the students of both groups on intelligence, socio-economic status, and achievement and confidence level in physical science. The second stage involved the experimental treatment, which consisted of ten subunits of VIII grade physical science taught through E-learning used teaching and through traditional teaching to control group. The third stage dealt with post testing of the control and experimental group using the achievement test in physical science.

4.1 Hypothesis Testing:
Hypothesis 1: There is a significant difference between pre test and post test achievement scores of the students in experimental group through E-learning strategy.

The mean and standard deviation values for achievement scores of the total sample (N=34) are calculated. The values are shown in the table 4.1

Table 4.1:Mean, SD values for Achievement Scores for students in Experimental group

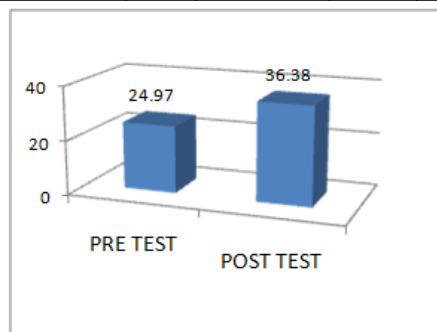| Variable	N	Mean	SD	t value
Pre test	34	24.97	6.58	6.50
Post test	34	36.38	7.83	

Figure-4.1: Bar graph depicting the pretest and post test scores in Achievement test of Experimental group .

Observation
From table 4.1, it is observed that the mean and standard deviation values of the Achievement scores in experimental group pre-test are 24.97 and 6.58 respectively. The mean and standard deviation values of the Achievement scores of post-test are 36.38and 7.83 respectively. The calculated 't' value 6.50 is found to be significant at both levels.

Interpretation
As the calculated 't' value 6.50 is significant at 0.05and 0.01 levels, the hypothesis is accepted. This shows that there is a significant difference in the achievement scores in the pre- test and post-test on Achievement test.

Findings
There is a significant difference in the achievement scores on among VIII class students. The students scored better in the post-test when compared to the pre-test.

Hypothesis 2:There is no significant difference between pre test and post test scores in achievement test of the students in control group.

The mean and standard deviation values for achievement scores of the total sample (N=34) are calculated. The values are shown in the table 4.2

Table 4.2:Mean SD values for Achievement Scores for students in Control group

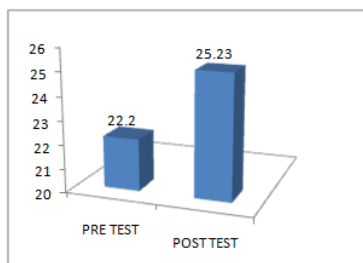| Variable	N	Mean	SD	T value
Pre test	34	22.20	6.87	1.69 NS
Post test	34	25.23	8.09	

Figure-4.2: Bar graph depicting the pretest and post test scores in Achievement test of control group

Observation
From table 4.2, it is observed that the mean and standard deviation values of the Achievement scores in control group pre-test are 22.20 and 6.87 respectively. The mean and standard deviation values of the Achievement scores of post-test are 25.23and 8.09 respectively. The calculated 't' value 1.690 is found to be not significant at both levels.

Interpretation As the calculated't' value 1.69 is not significant at 0.05and 0.01 levels, the hypothesis is accepted. This shows that there is no significant difference in the achievement scores in the pre- test and post-test on Achievement test in control group.

Finding
There is no significant difference in the achievement scores on among VIII class students. The students scored more or less the same in the post- test when compared to the pre-test.

Hypothesis 3:There is a significant difference between the post test scores in the student achievement test in experimental and control groups.

The mean and standard deviation values of the post test achievement scores of the students are calculated. The values are shown in the table 4.3

Table 4.3:Post test Achievement Scores for students in experimental and Control groups

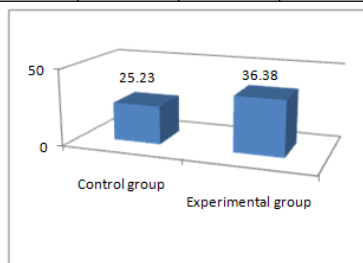| Variable	N	Mean	SD	
Control group	34	25.23	7.97	5.81**
Experimental group	34	36.38	7.83	

Figure-4.3: Bar graph depicting the post test scores in Achievement test of Experimental group and control group

Observation
From table 4.3, it is observed that the mean and standard deviation values of the Achievement scores in control group post -test are 25.23 and 7.97 respectively. The mean and standard deviation values of the Achievement scores of post-test in experimental group are 36.38 and 7.83 respectively.

Interpretation
The above table shows that there is a significant difference in the achievement scores in post-test scores on Achievement test in control and experimental groups.

Finding
There is a significant difference in the post- test achievement scores among VIII class students. The students in experimental

group scored better in the post- test when compared to control group.

Hypothesis 4:There is no significant difference between pre test and post test scores in achievement test of the students in control group.

The mean and standard deviation values for confidence level of the total sample (N=34) are calculated. The values are shown in the table 4.4

Table 4.4:Pre test and post test Scores in confidence level for students in Control group

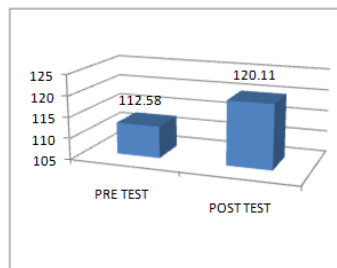| Variable	N	Mean	SD	T value
Pre test	34	112.58	27.29	1.20
Post test	34	120.11	24.29	

Figure-4.4: Bar graph depicting the pretest and post test scores in Achievement test of Control group

Observation
From table 4.4, it is observed that the mean and standard deviation values of the confidence level scores in control group pre-test are 112.58 and 27.29 respectively. The mean and standard deviation values of the confidence level scores of post-test are120.11 and 24.29 respectively. The calculated' value 1.20 is found to be not significant at both levels.

Interpretation As the calculated' value 1.20 is not significant at 0.05and 0.01 levels, the hypothesis is accepted. This shows that there is no significant difference in the confidence level scores in the pre- test and post-test in control group.

Finding
There is no significant difference in the confidence level scores on among VIII class students. The students scored more or less the same in the post- test when compared to the pre-test.

Hypothesis 5:There is a significant difference between pre test and post test confidence level scores of the students in experimental group through E-learning strategy.

The mean and standard deviation values for achievement scores of the total sample (N=34) are calculated. The values are shown in the table 4.5

Table 4.5:Mean, SD values for confidence level Scores for students in Experimental group

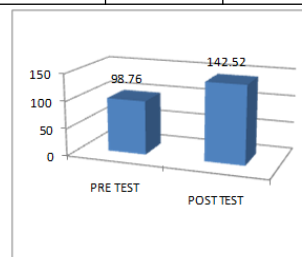| Variable	N	Mean	SD	T value
Pre test	34	98.76	12.12	11.59**
Post test	34	142.52	18.37	

Figure-4.5: Bar graph depicting the pretest and post test scores in Confidence level of Experimental group

Observation: From table 4.5, it is observed that the mean and standard deviation values of the confidence level scores in experimental group pre-test are 98.76 and 12.12 respectively. The mean and standard deviation values of the confidence level scores of post-test are 142.52 and 18.37 respectively. The calculated' value 11.59 is found to be significant at both levels.

Interpretation: As the calculated' value 11.59 is significant at 0.05and 0.01 levels, the hypothesis is accepted. This shows that there is a significant difference in the confidence level scores in the pre- test and post-test.

Finding

There is a significant difference in the confidence level scores on among VIII class students. The students scored better in the post-test when compared to the pre-test.

Hypothesis 6:There is a significant difference between the post test scores in the student confidence level scores in experimental and control groups.

The mean and standard deviation values of the post test achievement scores of the students are calculated. The values are shown in the table 4.6

Table 4.6:Post test Achievement Scores for students in experimental and Control groups

Variable	N	Mean	SD	t-value
Control group	34	120.24	24.24	4.27**
Experimental group	34	142.52	18.37	

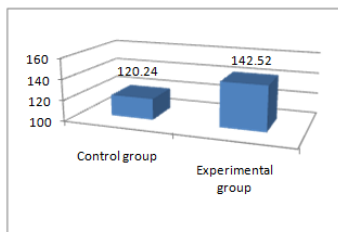***Significant at 0.05 level ,** Significant at 0.01 level**

Figure-4.6: Bar graph depicting the post test scores in confidence level of Experimental group and control groups.

Observation: From table 4.6, it is observed that the mean and standard deviation values of the confidence level scores in control group post -test are120.24 and 24.24 respectively. The mean and standard deviation values of the confidence level scores of post-test in experimental group are 142.52 and 18.37 respectively.

Interpretation: The above table shows that there is a significant difference in the confidence level scores in post-test scores in control and experimental groups.

Findings There is a significant difference in the post- test confidence level scores among VIII class students. The students in experimental group scored better in the post- test when compared to control group.

Major Findings:

The present study has generated some interesting findings concerning the benefit of using e- learning strategy in teaching Physical Science as compared to the traditional method of teaching.

• Results indicated that E-learning used method of teaching significantly improved students' performance on the achievement test and their confidence level in answering the questions after this intervention. However, there were significant differences in students' achievement and confidence level when the students who were taught using E-E-learning were compared to those taught using traditional methods.

• E-learning -used method of teaching seemed to be very effective in enhancing students' conceptual understanding as well as improving their confidence level. Also, there was a significant positive correlation in students' achievement and confidence level between the two groups. The correlation in students' achievement and confidence level of experimental group was found to be higher than that of that of control group.

• It can, therefore, be inferred that E-learning -used teaching method is effective for teaching of Physical Science.

Results and Discussions: It may be concluded from the above findings that E-learning used method significantly improves students' performance on the achievement test and their confidence level in answering the questions to prove that learning through E-learning used method proves more meaningful and effective than the traditional classroom strategy.

• Based on the analysis of data and interpretation of results, a set of findings and conclusions can be drawn and on the basis of their discussion, a wide range of implications and suggestions need also to be focused on for further research in the field related to this study. Some of the significant possibilities and provisions in terms of findings of this piece of research may be as follows.

Conclusion:

The study provides potential inputs for teacher education. Given the current Wide spread use of E-learning at all levels and for all subjects, it is imperative that pre-service teachers should learn the new technology. Besides pre-service training of teachers in the making, in-service training may also be given to the existing teachers to refurbish their acumen for teaching that is teaching effectively and meaningfully

References:
1. Deepak, K. Srivastava, R. & Anval, W. (2008).E-learning: A new way of education. UniversityNews, Vol.43, No.26, p.12.
2. Emerson, T.L.N., & Taylor, B.A. (2004). Comparing Student Achievement across Experimental and Lecture-Orientated Sections of a Principles of Microeconomics Course. Southern Economics Journal, 70, 672-693.
3. Nagy, A.(2005). The impact of e-learning, in: Bruck,p.A; Buchholz, A., Karssen, Z.; Zerfars, A (Eds).E-content: Technologies and perspectives for the European market. Berlin: Springeer-Verlog.pp.79-76.
4. Rachna, R. (2008). Effective teaching through e-learning,Edutracks. Aug.2007. Vol-6. No-12,p.8.
5. Rameswari and Ramar (2014). Effectiveness of e-learning on achievement of various categories of students in physical science,International Journal of Psychology and Education, Vol-2, issue -1, pp. 32-38.
6. Roffe, I., (2002), "E-learning: engagement, enhancement and execution", Quality Assurance in Education, Vol.10, No.1, pp.40-50.
7. Sanjaya Mishap and Rams c.Sharma(2005) "Development of e-learning in India,University News, Vol.43, No.11, p.9.
8. Starkman, N. (2007). E-learning:Going the distance,T.H.E. Journal, Vol.34, No.2, pp.18-24.
9. Shaw, G., & Marlow, N. (1999). The role of student learning styles, gender, attitudes and perceptions on information and communication technology assisted learning. Computers &Education, 33, 223-234.
10. Tavangarian D.,Leypold M., Nolting K., Roser M.,(2004). Is e-learning the solution for individual learning? Journal of e-learning 2004.