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E-Learning and Achievement in Chemistry among Higher Secondary Students in terms of Usage of Internet and Number of concepts viewed

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Abstract
E-learning has reached every nook and corner of the world and India is no exeption. Computers at school level are an increasingly valuable tool for learning one of our educational goals should be to prepare students for a world in which the E-learning will continue to play a significant role. A child must be computer literate in order to make the society into a knowledgeable society. The E-learning in the class rooms at school would allow faculty to take advantage of these emerging technologies in their class presentations and permit students to have the hands on experience of learning with these tools. Research indicates that E-learning can help support achievement and is especially useful in developing the higher order of skills of critical thinking, analysis and scientific inquiry by engaging students in authentic, complex tasks with in collaborative learning context (Fox & Mackeogh, 2003). Students can learn from computers where technology used essentially as tutors and serves to increase students basic skills and knowledge and can learn with computer where technology is used as a tool that can be applied to a variety of goals in the learning process and can serve as a resource to help develop higher order thinking, creativity and research skills. Academic achievement is of a paramount importance particularly in the present socio-economic and cultural contest obviously in the school great emphasis is placed on achievement right from the beginning of formal education. The school has its own systematic hierarchy which is largely based on achievement and performance rather than ascription or quality. In India, union territory of Puducherry, in the present study the investigators were trying to identify the extent of contribution of the background variables to the post-test scores and gain scores between E-learning and academic achievement in Chemistry among higher secondary students of Puducherry town. The result reveals the existence of a significant dependence between the learning and achievement in Chemistry further total sample. It may be regarded as representing slight association between the Usage of Internet and Number of concepts viewed variables. The Gain scores and post test scores in E-learning in Chemistry and the scores predicted from those two variables are found to be associated to the extent given by its multiple-R. The Co-efficient of multiple correlations is found to be significant at 0.00 level. This finding is consistent with those obtained by Pintrich *et al.* (1991) Zarabian F.; Rastegar Pour H.; Sarmady M. R.; Zandi B.; Farajollahi M.(2011) which shows that, online teaching methodology multimedia based instruction helps in teaching learning and the successful realization of instructional objectives. From the above study, the researcher has an idea that E-learning provides greater opportunities for the students to learn. It is better than the traditional method of learning. It brings a new kind of concrete experiences through Usage of Internet and Number of concepts viewed for the students of higher secondary school. Therefore, the researcher desires that more number of educational institutions should teach the topic Chemistry by using on-line method and make the process of teaching and learning process more effective.

Keywords: Pre-test scores, Post-test scores, Usage of Internet and Number of concepts viewed.

1. Introduction
E-learning has reached every nook and corner of the world and India is no exception. Computers at school level are an increasingly valuable tool for learning one of our educational goals should be to prepare students for a world in which the E-learning will continue to play a significant role. A child must be computer literate in order to make the society into a knowledgeable society. The E-learning in the class rooms at school would allow faculty to take advantage of these emerging technologies in their class presentations and permit students to have the hands on experience of learning with these tools.
Research indicates that E-learning can help support achievement and is especially useful in developing the higher order of skills of critical thinking, analysis and scientific inquiry by engaging students in authentic, complex tasks with in collaborative learning context (Fox &

Mackeogh, 2003) Students can learn from computers where technology used essentially as tutors and serves to increase students basic skills and knowledge and can learn with computer where technology is used as a tool that can be applied to a variety of goals in the learning process and can serve as a resource to help develop higher order thinking, creativity and research skills.

Academic achievement is of a paramount importance particularly in the present socio-economic and cultural contest obviously in the school great emphasis is placed on achievement right from the beginning of formal education. The school has its own systematic hierarchy which is largely based on achievement and performance rather than ascription or quality.

In India, in Puducherry, in the present study the investigators were trying to identify the extent of contribution of the background variables to the post-test scores and gain scores between E-learning and academic achievement in Chemistry among higher secondary students of Puducherry town.

2. Need for the study

E-learning has an important role in the enhancement and development of students' critical thinking. As a result, if academic institutions wish to develop E-learning initiatives, they must be receptive to implementing effective strategies to support such a beneficial and innovative initiative for the benefit of student learning.

The trend of using E-learning as learning and teaching tool is now rapidly expanding into education. Many educators and researchers have high hopes for E-learning, believing that it would provide more access to information and communication, and would ultimately lead to a new revolution in education E-learning in India, is still at an experimental stage (Murahari, B 2008). The use of E-Learning to teach chemistry at Higher secondary level is very scanty. This prompted the researcher to undertake a study on the Effectiveness of E-Learning in teaching chemistry.

3. Definition of Terms

3.1 Electronic learning or E-learning

Electronic learning or e-learning is an all-encompassing term generally used to refer to computer enhanced learning, although it is often extended to include the use of mobile technologies such as PDAs and MP3 players. It may include the use of web-based teaching materials and hypermedia in general, multimedia CD-ROMs or web sites, discussion boards, collaborative software, e-mail, blogs, wifis, text chat, computer aided assessment, educational animation, simulations, games, learning management software, with possibly a combination of different methods being used Delivery of content via all electronic media, including the internet, intranets, extranets, satellite, broadcast, video, interactive TV, and CD Rom. It encompasses all learning that people undertake, whether formal or informal, through electronic delivery." (OECD, 2001: 1) Strictly speaking online learning, or learning using the World Wide Web (including using a virtual learning environment such as Blackboard, WebCT etc.), is a subset of e-Learning.

3.2 Teaching Chemistry

Teaching Chemistry here refers to teaching of the concept Chemical Bonding for the First Year Higher Secondary Students.

4. Objectives

1. To identify the extent of contribution of the background variables to the post-test scores.
2. To identify the extent of contribution of the background variables to the gain scores.

5. Hypotheses

1. The background variables do not contribute to the post-test scores.
2. The background variables do not contribute to the gain scores.

6. Methodology

The sample of this study consisted of 243, Higher Secondary First Year students from seven chemistry classes out of Seven Schools from the Union Territory of Puducherry.

a. Tools Used

1. The E-content (On-line teaching material) software programme in Chemical Bonding was developed by the investigator for Higher Secondary First Year students'.
2. An Achievement test to measure the achievement in Chemistry was developed by the Researcher.
3. Personal data sheet with opinion about the programme.

b. Statistical Techniques Used

Step-wise Regression Analysis.

c. Dependent Variable

Achievement in Chemistry.

d. Independent Variable

E-learning methods

e. Background Variable

The Independent variables selected are Usage of Internet and Number of concepts viewed.

7. Analysis and Discussion

The data have been analyzed with SPSS Package and interpretation of data is given below

8. Hypotheses. 1: The background variables do not contribute to the post-test scores.

Table 1: Regression of Post-test scores on the background variables, and Feel about the Programme and assessment of the E-learning rogramme

Step No	Variables		R^2	F	dfs	Significance level
	External	Removal				
1	Usage of Internet	_	0.182	53.76	(1, 241)	0.000
2	Number of concepts viewed	_	0.204	30.83	(2, 240)	0.000
R = 0.452			R^2= 20.40			

The table shows the Regression of Post-test Scores through E-learning in chemistry on the background variables, Content, Quality, Presentation and in their total feeling and assessment about the E-learning Programme in Chemistry.

The step-wise regression is performed on the background variables, Content Scores, Quality Scores, Presentation Scores and in their total Scores and Assessment Scores about

E-learning programme in Chemistry to find out their contribution to the Post-Test scores of the Students through E-learning.

In the process of iteration of regression analysis, out of fourteen (nine background variables, content scores, quality scores, Presentation scores, and in their total scores and assessment scores about the E-learning in chemistry Programme) variables, it is found that only two variables have been contributing for the Post-Test scores through E-learning and they are 'Usage of Internet' and 'Number of concepts viewed'. All the two are background variables and no variable on the Feel about the Programme or Assessment has entered the iteration Process.

The extent of correlation between the set of two independent variables, namely 'Usage of Internet' and Number of concepts viewed' and Post-Test scores in E-learning is found to be 0.452 given by the Co-efficient of multiple-R. that is, the Gain scores in E-learning in Chemistry and the scores predicted from those two variables are found to be associated to the extent given by its multiple-R. The Co-efficient of multiple correlation is found to be significant at 0.00 level.

The R-square is found to be 0.204, which implied that 20.40 Percent of variance in the Post-Test scores through E-learning in Chemistry of Higher Secondary Students has been explained by the above set of two independent variables.

The Multiple Regression equation for the Post-Test scores through E-learning in Chemistry of Higher Secondary Students from the two significant elements can be given by

Y = - 6.247 (Usage of Internet)
+ 0.553 (Number of Concepts Viewed)
+82.794.

in terms of Unstandardised Regression Equation.

and Y = - 0.415 (Usage of Internet)
+ 0.149 (Number of Concepts viewed)

in terms of Standardised Regression equation.

Hypothesis. 2. The background variables do not contribute to the Gain scores.

Table 2: Regression of Gain scores on the background variables, and Feel about the Programme and assessment of the E-learning Programme.

Step No	Variables		R^2	F	dfs	Significance level
	External	Removal				
1	Usage of Internet	–	0.103	27.67	(1, 241)	0.000
2	Number of concepts viewed	–	0.130	17.92	(2,240)	0.000
R= 0.360			R^2= 13.00			

The table shows Regression of Gain Scores through

E-learning in chemistry on the background variables, Content, Quality, Presentation and in their total Feel about the Programme and assessment about the E-learning Programme in Chemistry.

The step-wise regression is performed on the background variables, Content Scores, Quality Scores, Presentation Scores and in their total Scores and Assessment Scores about

E-learning programme in Chemistry to find out their contribution to the Gain scores of the higher Secondary Students through E-learning.

In the process of iteration of regression analysis, out of fourteen (nine background variables, content scores, quality scores, Presentation scores, and in their total scores and assessment scores about the E-learning in chemistry Programme) variables, it is found that only two variables have been contributing for the Post-Test scores through E-learning and they are 'Usage of Internet' and 'Number of concepts viewed'. All the two are background variables and no variable on the Feel about the Programme or Assessment has entered the iteration Process.

The extent of correlation between the set of two independent variables, namely 'Usage of Internet' and Number of concepts viewed' and Gain scores in E-learning is found to be 0.360 given by the Co-efficient of multiple-R. that is, the Gain scores in E-learning in Chemistry and the scores predicted from those two variables are found to be associated to the extent given by its multiple-R. The Co-efficient of multiple correlations is found to be significant at 0.00 level.

The R-square is found to be 0.130, which implied that 13.00 Percent of variance in the Gain scores through E-learning in Chemistry of Higher Secondary Students has been explained by the above set of two independent variables.

The Multiple Regression equation for the Post-Test scores through E-learning in Chemistry of Higher Secondary Students from the two significant elements can be given by

Y = - 3.496 (Usage of Internet)
+ 0.461 (Number of Concepts Viewed)
+ 70.516

in terms of Unstandardised Regression Equation.

and Y = - 0.308 (Usage of Internet)
+ 0.165 (Number of Concepts viewed)

in terms of Standardised Regression equation.

9. Findings

1. It is found that only two variables have been contributing for the post test scores and they are 'Usage of Internet' and 'Number of concepts viewed'.
2. It is found that only two variables have been contributing for the gain scores and they are 'Usage of Internet' and 'Number of concepts viewed'.

The following conclusions favour the above mentioned findings:

Long and Jennings' (2005) tried to find out, the impact of

technology and professional development on student achievement. Regression analysis indicated an effect size of +0.55 favoring the online conditions. This study also looked into the maturation effects of teachers' using the online materials for the second time. As hypothesized, the results showed that the online materials were used more effectively in the second semester.

10. Conclusion

The result reveals the existence of a significant dependence between the learning and achievement in Chemistry further total sample. It may be regarded as representing slight association between the Usage of Internet and Number of concepts viewed variables. The Gain scores and post test scores in E-learning in Chemistry and the scores predicted from those two variables are found to be associated to the extent given by its multiple-R. The Co-efficient of multiple correlations is found to be significant at 0.00 level. This finding is consistent with those obtained by Pintrich *et al*. (1991) Zarabian F.; Rastegar Pour H.; Sarmady M. R.; Zandi B.; Farajollahi M.(2011) which shows that, online teaching methodology multimedia based instruction helps in teaching learning and the successful realization of instructional objectives. From the above study, the researcher has an idea that E-learning provides greater opportunities for the students to learn. It is better than the traditional method of learning. It brings a new kind of concrete experiences through Usage of Internet and Number of concepts viewed for the students of higher secondary school. Therefore, the researcher desires that more number of educational institutions should teach the topic Chemistry by using on-line method and make the process of teaching and learning process more effective.

11. Recommendations

The findings of this study reveal that the students who have exposure technology have better academic achievement. It is suggested that the students of higher secondary level need to be exposed to the new communication technologies they must be familiar to use the communication modes like internet, e-mail, blogs and social networking's for the purpose of learning process.

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