Impact of E- Content on Achievement in Chemistry among Government Higher Secondary School Students

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Abstract
An innovative application of computer in the teaching and learning process is e-content. This includes text, video, audio, animation and graphics. E-content is the advancement of technology to design, deliver, select, administer and extend learning. E-content in education is a powerful tool that may be used effectively and efficiently within the classroom to create more exciting learning environment and deliver a higher level of educational expertise to students. The present experiment brings out a clear-cut idea about the effectiveness of teaching Chemistry through e content on the XI Standard achievement in Chemistry. The main objectives of the study 1.To develop and validate the e-content packages in chemistry 2.To find out whether there is any significant difference between control and experimental group on the achievement in chemistry of government higher secondary school students. Experimental method was used in this study. Investigator select pre test and post test equivalent group design, sample of 25 students control group and 25 students experimental group of XI Standard students in government higher secondary Boys & Girls school Vedasandur from Dindigul District. For establishing homogeneity, the investigator was used Non-Verbal Intelligence test developed by Atmananda Sharma. Mean, Standard Deviation and 't' test was used for data analysis. Based on the results and findings of the present study, it can be strongly concluded that the students showed effective learning outcome in chemistry through experimental method only because of the e-Content developed for learning chemistry (Hydrogen). So, the e-Content on learning Hydrogen is a highly effective tool for higher secondary students.

Keywords: Effectiveness; E-Content; Achievement; Chemistry; XI Standard.

INTRODUCTION

Education is a powerful instrument of social changes and often initiates upward movement in the social structure. Education plays role in the development of individual as well as a country. Today the entire world is moving speedily towards digitization and we have to learn new things using new technologies .An innovative application of computer in the teaching and learning process is E-content. This includes text, video, audio, animation and graphics. E-content is the advancement of technology to design, deliver, select, administer and extend learning. E-content in education is a powerful tool that may be used effectively and efficiently within the classroom to create more exciting learning environment and deliver a higher level of educational expertise to the students. The new and improved technological advances have been created to ease the fear of the students and the possible misconceptions they may have about Chemistry before even entering the classroom. Chemistry teaching needs overhauling. To understand the real concept of science, classical face-to-face teaching methods may have to be supplemented by innovative methods. Developing e-content is emerging to be an innovative method which could help the learners visualize the content, so as to make them be creative and productive learners

NEED FOR THE STUDY

For many, the typical classroom experience is a teacher imparting his or her wisdom through lecture and presentation. This one-way communication tradition has resulted in transmission of knowledge since the dawn of time.Today, opportunities abound for learning through multiple media from pictures, overhead projectors, and filmstrips to moving pictures, videos, and computers. These opportunities not only

involve the learners but also hold teachers accountable for student learning. In conventional teaching, different teachers teach in different ways. Even though all the teachers use standardized methods and content to teach, the learning outcomes are different for different learners with unique abilities. No single method of teaching through a single medium can make students with unique abilities compete in future. The Directorate of School Education,

Government of Tamil Nadu, has planned to introduce web-based instruction for school students under the Information Technology Policy from 2010-2011 onwards. Technology offers a number of ways to make teaching-learning interesting and individualized. E-content is one among them. It can cater to the needs of the learners and allow them to proceed at their own pace. Teachers are in a position to develop e-content for facilitating their wards learn their subjects easily, effectively and interestingly at any time. It is only when teachers make an effort to develop an e-content, the potential benefits of teaching will be high. The teachers can develop an e-content for a difficult topic in such a way that it can help any mediocre student to comprehend the subject and depend on autonomous learning. Considering all the above, the investigator being a teacher educator made an attempt to develop an e-content for the unit "Hydrogen" in the XI standard of Tamilnadu State Board Syllabus.

OPERATIONAL DEFINITIONS OF THE KEY TERMS

Impact

It refers to the effect of e-content package on achievement in chemistry.

E –content

It refers to an electronic content includes text, image, animation, video, audio and visual effect for promoting better learning of chemistry subject. It consists of lesson with supporting activities, and materials in chemistry for the better achievement of higher secondary students.

Achievement in chemistry

It refers to the successful attainment of high score marks in the unit of hydrogen in chemistry.

Government Higher Secondary Students

They refer to who studied in the academic year (2019-20) in government higher secondary schools following syllabus of State Board of tamilnadu

OBJECTIVES OF THE STUDY

- To find out the significant difference between pre test scores of control group and experimental group
- To find out the significant difference in the pre test mean achievement score of knowledge, Understanding, Application between Control and Experimental group.
- To find out the significant difference between post test of control group and experimental group
- To find out the significant difference in the post test mean achievement score of knowledge, Understanding , Application between Control and Experimental group

HYPOTHESES OF THE STUDY

- There is no significant difference between pre test scores of control group and experimental group
- There is no significant difference in the pre test mean achievement score of knowledge, Understanding, Application between Control and Experimental group.
- There is no significant difference between post test of control group and experimental group
- There is no significant difference in the post test mean achievement score of knowledge, Understanding , Application between Control and Experimental group

METHOD

Experimental method was used in this research.

DESIGN OF THE STUDY

The pretest- post test equivalent group design was used in the study. The experimenter selected two groups of subject equivalent in all significant respects. One group serve as control group and other as experimental group.

Independent Variable: E- content package in Chemistry

Dependent Variables : Achievement in Chemistry

POPULATION

The population for the study the Government higher Secondary school students in Tamil Nadu.

Sample:

A sample of 50 students proposed to be drawn, 25 students in the experimental group and 25 students

in the control group in Government higher Secondary school in Dindigul district.

TOOLS FOR THE STUDY

- Non-Verbal Intelligence Test developed by Atmananda Sharma (2009)
- E- Content packages developed and validated by the investigator (2019).
- Achievement test developed and validated by the investigator and the research supervisor

(2019) based on Knowledge, understanding and application levels of learning

STATISTICAL TECHNIQUES USED
The investigator used the following statistical techniques for the data analysis.

- Mean.
- Standard Deviation
- t - test

HYPOTHESES 1

There is no significant difference between pre test scores of control group and experimental group

Table 1
Difference between the Pre-test Mean Achievement Scores of Control group and Experimental group

Variable	Group	N	Mean	S.D	Calculated 't' Value	'p' Value	Remarks
	Control	25	20.14	2.73			
Achievement					1.56	0.13	NS
	Experimental	25	21.64	3.96			

** significant at 0.01 level

From the above table, it is clear that the "p" value is greater than 0.01 so the null hypothesis is accepted. Hence there is no significant difference between the experimental group and control group students in their pretest scores of overall achievement.

HYPOTHESES 2

There is no significant difference in the pre test mean achievement score of knowledge, Understanding, Application between Control and Experimental group

Table 2

Difference among the Pre-test Mean Achievement Scores of knowledge, understanding and application between control group and experimental groups

Variable	Group	N	Mean	S.D	Calculated 't' Value	'p' Value	Remarks
Knowledge	Control	25	6.70	2.36	0.59	0.56	NS
	Experimental	25	7.04	1.67			
Understanding	Control	25	6.56	1.72	1.71	0.09	NS
	Experimental	25	7.48	2.06			
Application	Control	25	6.92	1.73	0.18	0.85	NS

Experimental	25	7.04	2.77

** significant at 0.01 level

From the above table, it is clear that the p value is greater than 0.05 so the null hypothesis is accepted. Hence there is no significant difference among the Pre-test Mean Achievement Scores classified on the basis of knowledge, understanding and application between control and experimental groups.

HYPOTHESES 3

There is no significant difference between post test scores of control group and experimental group

Table 3
Difference between the Post-test Mean achievement Scores of Control group and Experimental group

Variable	Group	N	Mean	S.D	Calculated 't' Value	'p' Value	Remarks
Achievement	Control	25	28.16	3.39	5.78	0.00**	S
	Experimental	25	34.64	4.45			

** significant at 0.01 level

From the above table, it is clear that the p value is lesser than 0.01 so the null hypotheses is rejected. Hence there is significant difference between the Post-test Mean achievement Scores of Control group and Experimental group.

HYPOTHESES 4
There is no significant difference in the post test mean achievement score of knowledge, Understanding, Application between Control and Experimental group

Table 4
Difference among the Post-test Mean Achievement Scores of knowledge, understanding and application levels between control and experimental groups

Level of learning	Group	N	Mean	S.D	Calculated 't' Value	'p' Value	Remarks
Knowledge	Control	25	9.10	1.89	2.60	0.01*	S
	Experimental	25	10.44	1.75			
Understanding	Control	25	8.72	2.11	6.48	0.00**	S
	Experimental	25	12.36	1.84			
Application	Control	25	9.92	1.65	3.94	0.00**	S
	Experimental	25	11.88	1.85			

** significant at 0.01 level

From the above table, it is clear that the p value is lesser than table 'p' value 0.01 so the null hypothesis is rejected. Hence there is significant difference in the Post-test Mean Achievement Scores of knowledge, understanding and application between control and experimental groups.

From the mean value it is understood that the experimental group students have scored significantly higher than the control group students in their knowledge, understanding and application.

FINDINGS OF THE STUDY

1. There is no significant difference between pre test scores of control group and experimental group
2. There is no significant difference in the post test mean achievement score of knowledge, Understanding, Application between Control and Experimental group.
3. There is significant difference between post test of control group and experimental group.
4. There is significant difference in the post test mean achievement score of knowledge, Understanding , Application between Control and Experimental group

RECOMMENDATIONS

1. The higher secondary students could overcome their prejudices about the subjects like Chemistry as a tough subject by learning through e-content.
2. They should co-operate with the teacher and respond positively to the teacher who wishes to integrate technology in their teaching
3. The management of the schools could encourage the teachers working in their institutions to use technology in teaching.
4. Periodic orientation could be arranged to teachers so as to update them about the latest and effective technological tools

CONCLUSION

No significant difference was found between the pre-test mean achievement scores of control group and experimental group irrespective of the levels of learning before treatment. The experimental group performed better than the control group. This better performance of the experimental group shows the effectiveness of e-content than the traditional method. Both the control and experimental group scored higher in the post-test mean achievement scores compared to pre-test scores. This means that any method would likely be effective in terms of the three levels of learning namely knowledge, comprehension and application. Significant difference was observed between the control group and experimental group in

their gain mean achievement scores. Based on the results and findings of the present study, it is concluded that the developed e-Content for learning chemistry (Hydrogen) for higher secondary level First year students is a highly effective tool for learning chemistry. Further, it is proved that there is retention capability in learning chemistry (Hydrogen) using e-Content method. The intervening variables did not have any impact or influence on the learning outcome in Chemistry through control and experimental groups. Hence it can be strongly concluded that the students showed effective learning outcome in chemistry through experimental method only because of the e-Content developed for learning chemistry (Hydrogen). So, the e-Content on learning Hydrogen is a highly effective tool for higher secondary students.

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