

***EFFECT OF WEB BASED INSTRUCTION ON ACHIEVEMENT IN CHEMISTRY
IN RELATION TO ATTITUDE TOWARDS WEB BASED COURSE***

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Abstract

The present study investigates the effect of web based instruction on achievement in chemistry in relation to attitude towards web based course. The sample was drawn of IX class students from schools of Amritsar District affiliated to CBSE. Instructional material based on web was prepared and implemented to the experimental group after pre-testing and gain scores were computed after post-test for all the students. The attitude scale was also administered. A 2x2 ANOVA (Analysis Of Variance) was used to arrive at the following conclusions: (i) Group taught through web based instruction was found to attain significantly higher achievement scores as compared to control group. (ii) Performance of students with high attitude towards web based instruction was found better than low attitude group. (iii) No significant interaction effect was found to exist between the two variables attitude towards web based course and gender on achievement of secondary school students (experimental group) in Chemistry.

Key Words: *web based instruction, Achievement, Attitude*

Education aims at preservation and transfer of culture from one generation to other. The traditional method of teaching could not keep up pace with changing needs of the society. The traditional method of teaching is effective in transfer of simple knowledge to the learner but is not so effective for more and complete learning. This major drawback can be overcome by using new innovative methods of teaching. Several general and educational objectives could be fulfilled if children are given opportunity to learn with new innovative method. One of the innovative methods is Web Based Instruction.

Today, the Web Based Instruction (WBI) is on the way of being an important learning environment which provides students with a new and rich style of learning. The web is able to offer a worldwide democratic learning content to students, who are from different cultures, speak different languages without gender discrimination. In this century a new brand of knowledge known as computer emerged. The WBI has grown as a unique space and become one of our major channels of information and communication. The web provides a wealth of information to an incredibly diverse user population and designers face the constant challenge of developing Web Based Instruction that need to meet diverse user need.

The role of the teacher is transformed from the teaching of knowledge to that of a facilitator of learning. An important principle in teaching on the web is to see whether a student has learnt the material and successfully able to communicate to others. The effective participation in learning itself is a positive learning experience. The web-based atmosphere allows more affective interaction between students and the instructor.

WEB BASED INSTRUCTION (WBI)

With the establishment of National and State Technology Standards there is a growing trend towards working and learning in a technology rich environment. There is a continuing need for teachers to promote effective learning with the use of technology in the classroom. WBI usage has increased greatly over the last few years. It allows training and teaching to be continued anywhere and at any time. Learner in web based environment can receive fast and updated information about a given subject matter.

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Web Based Instruction programs can be easily delivered to the learners in an individualized manner based on the person's preferred learning style. A flexible Web Based Instruction system can look into the user eyes and determine the best way for presenting the information that the user is ready. In educational literature, the term "Web-Based Instruction" has seen frequent usage, and on account of its novelty, is interpreted broadly as any form of instructional delivery in which the World Wide Web is included as a tool.

Web Based Instruction has provided students, with a wide variety of teaching/learning alternatives that have expanded the educational process beyond the traditional classroom. Web Based Instruction offers a new sensibility and means of social interaction engineered towards learning. In Web Based Instruction the nature of content becomes dynamic as compared to the static texts published on a certain date.

Web Based Instruction definitely provides a change in the way in which instruction is imparted to students. There is a shift in knowledge acquisition (from the class room to other modes of knowledge) in this present scenario. WWW brings all sorts of information into the class room irrespective of subject matter. The www has emerged as a dynamic and powerful medium for channel zing and utilizing knowledge inside and outside the class room.

The use of the internet is supposed to enable the teachers to reach any student at anytime and anywhere. When the learner has to clarify some doubts, if they are absent for any specific lecture there is no way to have repetition without the use of the latest technology. And that is a great boon conferred by technology i.e. Web-Based Instruction. Web-Based Instruction is a hyper media-based program conducted utilizing the attributed and resources of the world www. Web Based Instruction could be an effective median for research study. The Web Based Instructions allows students to assemble a set of rich resources easily.

The role of the teacher is transformed from the teaching of knowledge to that of a facilitator of learning. An important principle in teaching on the web is to see whether a student has learnt the material and successfully able to communicate to others. The effective participation in learning itself is a positive learning experience. The Web Based atmosphere allows more affective interaction between students and the instructor. It can be as effective as affective learning experience. It enables the learner to participate successfully in the learning process and receive individual attention.

Web Based Instruction is the educational craze that is sweeping the nation. The traditional schools are only now beginning to discover what online universities have been saying all along. Online schools have declared that the quality of education received in the virtual classroom is just as good as or better than in standard classroom settings. As a result the mainstream educational institutions now jumping on the web based bandwagon. . Web Based learning constitutes part of technology based learning and imparts the learning through internet, intranet and extranet. Web Based Instruction is mainly personalized to the individual. It is network assisted and often learner learns in the matter of fly or assembling learning experience on the fly. It is a perfect blend of learning method such as virtual classroom, collaboration, simulation, community and even a classroom.

TRADITIONAL INSTRUCTION

Traditional instruction is concerned with the teacher being the controller of the learning environment. Power and responsibility are held by the teacher and they play the role of instructor (in front of lectures) and decision maker (in regards to curriculum content and specific outcome). They regard students as knowledge holes that need to be filled with information in short. Traditional instruction occurs mainly by lecture method.

ACHIEVEMENT

Encyclopedia of Education (1997) defined achievement as a mean, successful accomplishment or performance in a particular subject area or course, usually by reasons of skills, hard work and interest, typically summarized in various types of grades, marks or scores. Thus achievement refers to the successful performance of the student in academic and non academic activities of the school.

ATTITUDE TOWARD WEB BASED COURSE

The success of any initiatives to implement technology in an educational program depends strongly upon the support and attitude of students involved. If teachers believed or perceived proposed computer programs as fulfilling neither their own or their student's needs, they are not likely to attempt to introduce technology into their teaching and learning. Among the factors that affect the successful use of Web Based Instructions in the classroom and students attitude towards Web Based Course.

EMERGENCE OF THE PROBLEM

The future of man is stubbornly linked to Chemistry advances and the development of productive activities. Concept of computer and its applications is not a new one in developed countries. Researchers are being undertaken to demonstrate that how computer technology when applied to Chemistry learning can motivate, engage pupils in teaching learning processes. Technology promotes meaningful and engaged learning and development of higher order thinking skills and create environment of problem solving and information retrieving purposes.

In this age of technology, there is a paradigm shift in our schools from traditional methods of teaching to the innovative techniques of teaching. Web Based Instruction has the potential to cope with the needs of individualized learning, cooperative learning and constructive approaches. In the classroom, Web Based Instruction offers more flexibility in presentation and better management of instructional techniques. Web based courses engage students in meaningful interactive dialogue and promotes conceptual learning and clarity.

Thus, the study is being done as the investigator feels that the schools should develop a vision of how technology can improve teaching learning process and make the pupils more informative and develop the skills

and abilities. In the present study investigator used the web based instruction using website, for teaching of Chemistry at secondary level and also evaluated the attitude of student toward Web Based Course.

OBJECTIVES

- To study the difference in achievement of secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction.
- To study the difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course.
- To study the difference in achievement of secondary school students (experimental group) in Chemistry with respect to gender.
- To study interaction effect of attitude towards web based course and gender on achievement of secondary school students (experimental group) in Chemistry.

HYPOTHESES

Ho1: There exists no significant difference in achievement of secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction.

Ho2: There exists no significant difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course.

Ho3: There exists no significant difference in achievement of secondary school students (Experimental group) in Chemistry with respect to gender.

Ho4: There is no significant interaction effect of attitude towards web based course instructional strategies and gender on achievement of secondary school students (experimental group) in Chemistry.

Sample

THE SCHOOL SAMPLE

The school sample was drawn from the representative secondary schools where the medium of instruction was English. Initially purposive sampling was employed to select these schools which have facilities of LAN and internet on each system. For this investigation, 200 students of class IX were randomly taken from two schools of Amritsar city.

THE STUDENT SAMPLE

After selecting the schools, class IX student sample (N=200) was drawn randomly from the two schools. The investigator picked up 100 students from each school.

The sample comprising of 200 students were randomly divided into two groups- the experimental group and the control group. In order to make equivalent groups, matching was done at the pre-test stage for two variables- variable of achievement in Chemistry (pre-test) and intelligence. t-test was employed to compare mean scores on the variable of achievement in Chemistry and Intelligence. Insignificant t-ratio showed that both the groups were matched and equivalent. The experimental group was taught with Web based instruction and the control group was taught with conventional teaching. The experiment lasted for two weeks.

TOOLS USED

In the present study the following tools were used:

1. An achievement test in Chemistry for class IX was constructed and standardized to measure the performance of students before and after the treatment.
2. General Group Test of Intelligence (GGTI) by Ahuja (2005).
3. Web based instructional package in Chemistry for class IX was developed and validated (content wise).

Procedure

The following procedure was adopted for present study: **Phase 1**

(Matching the Groups and Pre-testing) Phase II (Experimental phase)

Phase

III

(Post-testing)

Table 1 Showing diagrammatic layout of the procedure

Group ↓	Group A Web based instruction	Group B conventional instruction
Phase I	Matching and Pre-testing on achievement in Chemistry	Matching and Pre-testing on achievement in Chemistry
Phase II	Teaching by Web based instruction	Teaching by conventional method
Phase III	Post test on achievement in Chemistry and attitude towards Web based course scale was administered	Post test on achievements in Chemistry

DATA ANALYSIS AND INTERPRETATION

The purpose of present study was to investigate the effect of web based instruction on achievement in chemistry in relation to attitude towards web based course. In order to achieve the objectives of the study and test hypotheses, the analysis of data was made with help of t-test and ANOVA.

Hypothesis I: First hypothesis was framed to examine the significant difference in achievement of secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction”.

To test the hypothesis, t-test was applied to determine the significant difference in achievement of secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction”. The result of this analysis has been reported in table 2

Table 2 : ‘t’- ratio of achievement scores in Chemistry of experimental and control group

Group	N	Mean	S.E.D	Mean	df	t- ratio
Experimental	100	7.37	0.364	4.010	198	11.022*
Control	100	3.36				

* Significant at 0.01 level

(Critical value 1.96 at 0.05 level and 2.58 at 0.01 level, df =198)

Table 2 reveals that calculated t-value 11.022 was found to be more than critical value (2.53) at 0.01 level of significant. So, it is suggested that the achievement of secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction is different. The mean of achievement experimental group is 7.37 and that of control group is 3.36. The null hypothesis state that “There exists no significant difference in achievement of Secondary school students in Chemistry when taught through Web Based Instruction and traditional instruction.” is rejected.

The above result is consistent with the results of the study conducted Ryan and Careton (1999), Leasure (2000), Maki et al (2000), Cooper (2001) and concluded that there is significant difference in achievement of experimental group and that of control group ”.

Hypothesis II: Second hypothesis was framed to examine the significant difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course”.

To test the hypothesis, t-test was applied to determine the significant difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course”. The result of this analysis has been reported in table 3

Table 3: t-ratio of achievements scores of secondary school students in Chemistry with high and low level attitude towards web based course (N=54)

Attitude	N	Mean	S.E.D	Mean	df	t-ratio
High	27	11.04	0.532	7.037	52	13.218*
Low	27	4.00				

*Significant at 0.01 level

(Critical value 1.96 at 0.05 level and 2.58 at 0.01 level, df =52)

Table 3 reveals that calculated t-value 13.218 was found to be more than the critical value (2.58) at 0.01 level of significant. So, it is suggested that the achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course is different. The mean of students with high attitude is 11.04 and that of low attitude is 4.00. The null hypothesis state that “There exists no significant difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course” is not accepted.

It is clear that the students of experimental group achieved higher due to high level of attitude towards web based course.

Hypothesis III: Third hypothesis was framed to examine significant difference in achievement of secondary school students (experimental group) in Chemistry with respect to gender”.

To test the hypothesis, t-test was applied to determine the significant difference in achievement of secondary school students (experimental group) in Chemistry with respect to gender”. The result of this analysis has been reported in table 4

Table 4: t-ratio of achievements scores of secondary school students (experimental group) with respect to gender (N=100)

Gender	N	Mean	S.E.D	Mean	df	t-ratio
Boys	50	7.14	0.606	7.60	98	0.760*
Girls	50	7.60				

*Significant at 0.01 level

(Critical value 1.96 at 0.05 level and 2.58 at 0.01 level, df =98)

Table 4 reveals that calculated t-value 0.760 was found to be less than critical value (1.96) at 0.05 level of significant. So, it is suggested that the achievement of both boys and girls of experimental group is same. The mean of achievement of boys is 7.14 and that of girls is 7.60. The null hypothesis that “There exists no significant difference in achievement of secondary school students (experimental group) in Chemistry with respect to gender” is not rejected.

Hypothesis IV: Fourth hypothesis was framed to examine significant interaction effect of attitude towards web based course and gender on achievement of secondary school students (experimental group) in Chemistry”.

In order to test this hypothesis, two way ANOVA was used by taking attitude scores towards web based course and gender as independent variables and achievement (in Chemistry) as dependent variable. F-value so obtained has been entered in table 5.

Table 5 showing result of ANOVA 2x2 factorial design showing effect of attitude towards web based course and gender on the achievement of secondary school students (experimental group) in Chemistry

Source of variation	Sum of square	df	Mean square	F-value
Attitude level (A)	81.322	1	81.322	8.807*
Gender(B)	13.630	1	13.630	1.476
Attitude x Gender (A*B)	1.322	1	1.322	0.143
Total	3640.000	54		

* Significant at 0.01 level

Table 5 reveals that F-value came out be 0.143 which is not significant at 0.01 level. Thus the null hypothesis IV “There exists no significant difference in achievement of secondary school students (experimental group) in Chemistry with high and low level of attitude towards web based course” is not rejected.

The results inserted in table are for 2x2 analysis of variance factorial design attitude towards web based course varied at two levels viz high and low levels and gender were also varied at two levels. ‘F ’value 0.143 showing interaction between attitude towards web based course and gender is not significant.

Thus, we conclude that independently attitude towards web based course significantly affect the achievement of students (experimental group) in Chemistry but interaction effect of attitude towards web based course and gender towards achievement of secondary school students (experimental group) is found to be not significant.

Thus, Hypothesis IV “There exists no significant interaction effect of attitude towards web based course and gender on achievement of secondary school students (experimental group) in Chemistry” is not rejected.

EDUCATIONAL IMPLICATIONS

- Attitude towards web based course plays an important role to improve the achievement of students in Chemistry because it makes the students active participants of an educational process.

- It can be used with all the categories of the student viz. high, average and low attitude towards web based course students.

- It increases the concentration of students in Chemistry.

So a teacher should use web based instruction in Chemistry in class room which can make the task of the teacher easier and students can achieve better in Chemistry.

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