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TECHNOLOGY BASED LEARNING ENVIRONMENT AND ACHIEVEMENT OF STUDENTS IN CHEMISTRY AT SECONDARY LEVEL OF CBSE AND UP BOARD IN INDIA

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Abstract:

The fast growing accessibility and capability of emerging technologies have fashioned enormous possibilities of designing, developing and implementing innovative teaching methods in the classroom. The global technological scenario has paved the way to new pedagogies in teaching-learning process focusing on technology based learning environment and its impact on student achievement. The present experimental study was conducted to determine the effectiveness of technology based learning environment on student achievement in chemistry at secondary level. A pre-test- post-test equivalent group design was used to compare the achievement of the two groups. A Pre-test and A post-test containing 50 items each from Chemistry textbook were developed and administered. The collected data were statistically analysed. The results showed that there was a significant difference between the mean scores of Experimental group and the Control group. The performance of Experimental group was better on post-test scores that indicted that teaching through technology based learning environment enhanced the achievement level of the students. On the basis of the results, it was recommended that teaching and learning through information and communication technologies may be adopted to enhance the language learning capability of the students.

Keywords *Chemistry at secondary level, Student Achievement, Technology Based Learning*

INTRODUCTION

Since the ICT revolution is a revolution in learning, it also has transformed available technologies, the mean and methods of studying, the modalities of school operations, the manner

of investment and expenditure of resources and the very way we think about education could be and should do. For extending the learning of students, use of ICT is acknowledged as a learning tool for pupils and has acknowledged how pupils who are confident and proficient in ICT can bring with them opportunities for extending their learning as they use their ICT in other subjects in the school curriculum.. However, existing and emerging ICT teaching tools provide further opportunities to enhance subjects and add value to teaching and learning. For example, the use of interactive whiteboards, video projection units, microscopes connected to computers, prepared spread sheets to capture and model data, CD-ROMs, presentations with video and carefully selected resources from the Internet all provide examples of how ICT can be embedded into subject teaching [1]. Use of ICT by a teacher may involve little or no use of ICT by pupils and, consequently, may do little to apply and develop their ICT capability. However, use of ICT by the teacher can enhance and stimulate the learning experiences of pupils and contribute to the achievement of subject objectives. It is important to recognize the different contributions that ICT can make to teaching and learning. In this new era, due to enhancement of technology, educational institutions are serving more ethnically, and culturally diverse student body than ever before. Studies about education, Cognitive psychology, and neurology have offered new insights on how humans learn. In addition, the infusion of technology has redefined work skills and society's expectations about what it means to be an educated person. Teachers are using different methodologies to teach their students in a better way. There are a number of techniques and methodologies for diverse situations in the classrooms, and also many learning theories given by different psychologists. One of these is 'Constructivism,' which provides a valuable Framework for using computers and other technologies in interesting ways. With the help of the technology, students gain understanding about their world, and enhance their learning and work by increasing their connections with resources outside school walls. However, computers are not inherently instructional tools, and most teachers need suggestions for using them. Computers can support the variety of ways learners construct their own understanding. Students who gather information from the Internet can be self-directed and independent [2]. They can choose what sources to examine and what connections to pursue. Depending on the parameters set by teachers, the students may be in complete control of their topics and their explorations. Of course, there has been some concern that educational institutes are investing in such delivery modes as a response to a 'technological imperative' [3] or as a cost-cutting exercise [4], rather than for good

educational and pedagogical reasons. Further, it has been argued that such educational delivery neither is what students want [5], nor delivers a good learning environment [6]. Without a doubt, such concerns need to be addressed, but [7, 8 & 9] all indicate that it is not the actual technology of delivery that is important, but rather it is how the teacher/lecturer uses that technology to create new experiences for the learner that are important in creating a good learning experience. There is also a growing body of literature arguing the need to create Internet-based learning solutions that are explicitly grounded in learning theory [10, 11, &12] to ensure a high-quality learning environment. Research has shown that the learning environment is an alterable educational variable which can directly influence cognitive and affective outcomes [13& 14]. Langford pointed out that 30–60% of our learning was due to our brain's wiring and 40–70% was a result of the environmental impact [15]. From this suggestion, it is obvious that, while the environment is not the only variable which affects learning outcomes, it is a very important one. Cooke pointed out that all innovative approaches, no matter how simple or complex should be designed with the students in mind. Students' perspective on such innovations is critical [16]. For many high school students, systematic integration of web-based applications into teaching routines is still in its infancy. New initiatives can be sustained provided that there are appropriate research and development mechanisms in place to evaluate them. By applying some of the research techniques associated with learning environments, the success of such innovative practices can be adequately ascertained.

OBJECTIVE OF THE STUDY:

The main objectives of the present investigation were

- To study the difference between experimental group taught through ICT and controlled group taught through traditional method. 2- To study the difference between experimental groups (CBSE) taught through ICT and experimental group (U.P. Board) taught through traditional method. 3- To study the difference between controlled groups (U.P. Board) taught through traditional method and controlled group (CBSE) taught through traditional method.

RESEARCH HYPOTHESIS

H1-

There is a difference between experimental group taught through ICT and controlled group taught through traditional method.

H2

There is a difference experimental groups (CBSE) taught through ICT and experimental group (U.P. Board) taught through traditional method.

H3

There is a difference between controlled groups (U.P. Board) taught through traditional method and controlled group (CBSE) taught through traditional method.

RESEARCH DESIGN:

For the purpose of the present study, the pre-test post-test equivalent group design suggested by Best (1983) was adopted with certain modification

POPULATION:

The population of the present study is the 9^{th} class science students studied during the session 2011-2012 in different secondary school of C.B.S.E and U.P. Board of Gorakhpur region of Eastern UP having ICT facilities.

SAMPLING

For the purpose, a list of secondary school of CBSE and U.P. Board having ICT facilities was prepared & four institutions were selected with the help of Lottery Method. The selected samples of 4 schools were randomly divided into groups. (i) Experimental groups (ii) Controlled groups 140 and 80 students were selected from CBSE and UP board respectively, having same Entering behaviour, Intelligence and Socio-Economic status. Sample students were randomly divided into two groups i.e. control group and experimental group The class sections were allotted randomly to control and experimental groups. To measure the achievement level of students, two different types of tests (pre-test and post-test) were developed by the researcher which were administered after validation. The tests consisted of multiple choice items. The

students of experimental group were taught through using computer technology and they were provide a learning environment based on computer lab, internet usage, emails, chatting, online material availability and web based instruction.

TOOLS OF RESEARCH:

For the purpose of the present study following tools were prepared

1- Lesson plan of the selected topic based on traditional method of teaching

2- Lesson plan of the selected topic taught through ICT by investigator.

3- Achievement test in (Chemistry) for the selected topic taught by the investigator.

4- Intelligence Test

5- Socio-Economic status scale.

DATA COLLECTION

The required data was collected at two stages as pre-test and post test scores from the achievement test in chemistry.

ANALYSIS AND INTERPRETATION OF DATA

Quantitative techniques were used for analysing the collected data. For the objectives data was analysed quantitatively employing statistical techniques of mean, S.D. and t-test.

H1-

There is a difference between experimental group taught through ICT and controlled group taught through traditional method.

Table-1

S. No.	Groups	N	Mean	S.D.	't' Value
1.	Experimental	110	16.32	3.59	3.45
2.	Controlled	105	14.18	5.28	

Table-2

Level of Significance	Obtained 't' value	Table value with df= 223	Result
0.05	3.45	1.96	Significant
0.01	3.45	2.59	Significant

H2

There is a difference experimental groups (CBSE) taught through ICT and experimental group (U.P. Board) taught through traditional method.

Table-3

S. No.	Groups	N	Mean	S.D.	't' Value
1.	Experimental (C.B.S.E. Board)	70	17.18	3.41	3.48
2.	Experimental (U.P. Board)	40	14.18	3.46	

Table-4

Level of Significance	Obtained 't' value	Table value with df = 108	Result
0.05	3.48	1.98	Significant
0.01	3.48	2.63	Significant

H3 There is a difference between controlled groups (U.P. Board) taught through traditional method and controlled group (CBSE) taught through traditional method.

Table-5

S. No.	Groups	N	Mean	S.D.	't' Value
1.	Controlled (C.B.S.E. Board)	70	15.17	5.72	3.30
2.	Controlled (U.P. Board)	35	12.20	3.52	

Table-6

Level of Significance	Obtained 't' value	Table value with df = 103	Result
0.05	3.30	1.98	Significant
0.01	3.30	2.63	Significant

DISCUSSION OF THE RESULT

Table-1 shows that the mean value of achievement score of experimental groups taught through ICT (M_1=16.32) is higher than the mean value of achievement score of controlled group (M_2=14.18) taught through traditional method. The S.D. of experimental group was 3.59 and controlled group was 5.28. The calculated't' value was 3.454 and table value at df =223 is 1.96 at 0.05 and 2.59 at 0.01 level of significance. This clearly shows that the obtained't' value is more than the table value at both the level of significance. The experimental group got higher achievement score on Chemistry achievement test than the controlled group. The reason was very clear that experimental group were more exposed to such technological programmes in and outside the school. On the contrary, the controlled group students had limited resources in and outside the school campus. Thus, it can be concluded that there is a significance difference between experimental groups taught through ICT programmes and controlled group taught through traditional teaching approach.

Table 3 shows that the mean value of achievement score of experimental group II (CBSE Board) taught through ICT (M_1=17.18) is higher than the mean value of achievement score of

experimental group I (U.P. Board) (M_2=14.80). The S.D. of experimental group II (CBSE Board) was 3.41 and experimental group I (U.P. Board)was 3.46 The calculated 't' value was 3.48 and table value at df =108 is 1.98at 0.05 and 2.63at 0.01 level of significance. This clearly shows that the obtained't' value is more than the table value at both the level of significance. Thus, it can be concluded that there is a significant difference between experimental group II (CBSE Board) taught through ICT programme and experimental group I (U.P. Board) taught through ICT programme.

Table 5 shows that the mean value of achievement scores of controlled group I (CBSE Board) taught through traditional method (M_1=15.17) is higher than the mean value of achievement score of controlled group II (U.P. Board) taught through traditional method (M_2=12.20). The S.D. of controlled group I (CBSE Board) was 5.72 and controlled group II (U.P. Board) was 3.52. The calculated't' value was 3.30 and table value at df =103 is 1.98 at 0.05 and 2.63at 0.01 level of significance. This clearly shows that the obtained't' value is more than the table value at both the level of significance. Thus, it can be concluded that there is a significant difference between controlled groups I (CBSE. Board) taught through traditional method and controlled group II (U.P. Board) taught through traditional method

CONCLUSION

The focus of the study was to determine the effectiveness of technology based learning environment in which instructions are imparted through Information and Communication Technologies (ICTs) and its impact on student achievement in chemistry. Results in pre-test indicated that there was no significant difference between the achievement scores of the control group and the experimental group. It proves that the traditional teaching method does not enhance academic abilities of the students at desirable level. When compared with the results in post-test, it is clear that the students performed better when taught in technology based learning environment and it helps students develop the abilities of knowledge, comprehension and application as the items of achievement tests were based on these measures. Both the high achievers and low achievers of experimental group showed significant difference in the mean score of achievement on post-test that suggests the effectiveness of Information and

Communication Technologies in teaching learning process as compared to traditional method. It is also evident that the existing methods of teaching English do not involve the usage and application of ICTs and it also shows that teachers are not trained in modern instructional techniques. Consequently, the students of experimental group showed significant better performance when compared with control group on scores of post-test.

RECOMMENDATION

Following recommendations are presented for future strategies:

1. Technology based learning environment might be promoted and provided to enhance the achievement level of the students in chemistry subject.
2. Computer laboratories with Internet, networking and other facilities of technology may be provided to improve the capability of teaching learning process.
3. Information and Communication Technologies (ICTs) as a subject may be introduced in schools and colleges.
4. Libraries play a vital role in teaching and learning process. To teach technology, on-line libraries may be introduced
5. Through the use of technology interest may be developed in the students who are slow learners.

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