ISSN- 2349-7076

EduInspire-An International E-Journal
An International Peer Reviewed and Referred Journal
Council for Teacher Education
(CTE, Gujarat Chapter)
www.ctegujarat.orgEmail. jig_har@yahoo.com

EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN LEARNING SCIENCE

Ravi I. Kurabet
Research Scholar, Department of Education,
Rani Channamma University,
Belagavi (Karnataka)
Dr. G. R. Angadi
Associate Professor, School of Education,
Central University ofGujarat,Sector-29,
Gandhinagar-382030

Abstract

This article discusses the ICT and its diverse set of technological tools and resources which are used to communicate, create, disseminate, store and managing the information and also to determine the effectiveness of Information and Communication Technology in learning Science by the students of secondary schools. which has shown that the appropriate use of ICTs which can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform. Learning science and its components like physics, chemistry and biology and also which disseminates the active learning as one of the tool of ICT. If ICT designed and implemented properly, with supported education can promote the acquisition of the knowledge and skills that can empower students for lifelong learning. Tools used for the study were Achievement test and Attitude Scale. The findings showed that students of secondary schools were highly motivated using ICT then that of traditional method and study confirmed that students learning had benefited from the use of the ICT. Student's opinioned their attention was more focused from having a large focal point by using ICT.

Keywords: ICT based learning, Conventional method of learning, Learning science, Achievement in science, Secondary school students and Gender

ISSN- 2349-7076

EduInspire-An International E-Journal (Peer Reviewed)

EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN LEARNING SCIENCE

Ravi I. Kurabet

Research Scholar, Department of Education,

Rani Channamma University,

Belagavi (Karnataka)

Dr. G. R. Angadi

Associate Professor, School of Education,

Central University ofGujarat,Sector-29,

Gandhinagar-382030

Introduction: The Information and Communication Technology is often used as an extended synonym for Information Technology but is a more specific term that stresses the role of unified communications and the integration of telecommunications. Here the technology can be referred as a system having various interrelated components arranged by scientific method to obtain desire objectives, ICT is a diverse set of technological tools and resources which is used to communicate and to create, disseminate, store and managing the information. The term information refers to any communication or representation of knowledge such as facts, data, or opinions in any medium or for including textual numerical graphic cartographic, narrative or audiovisual forms.

Integration of Information and communication technology in education(ICT) in education it means technology based teaching and learning process that relates the use of technologies and tools in schools. In Jorge et,al (2003) description it is right to say that most of all ranges of subjects like science, math's, languages and humanistic also other major fields can be learned effectively through technology based tools and equipment's. ICT provides complementary supports for both students and teachers where it involves effective teaching and learning process with the help of tools to serve the purpose of learning aids. The attitude of teachers and students in integration of ICT based education in secondary schools revels that it will leads the capabilities and policies to get more knowledge in school subjects. Bindu(2017), states the findings of the study it is revealed that the attitude and awareness towards class rooms by using information and communication technology case of expatriate Indian teachers in UAE both quantitative and qualitative data shows the results that the teachers gender and age had positive attitude towards using information and communication technology

influences teachers gender and age with average level of awareness of information and communication technology.

Thus the purpose of this article is to discuss and to suggest there is a need to generate ICT-based education which makes maximum respondents brows social networking skills, followed by the students with the effective use of ICT tools. The researcher concluded after analysis of effective use of ICT in science learning at secondary school, the post-test achievement scores are higher than the pre-test achievements scores in science and its components.

Operational definitionsof terms:

- **Information and Communication Technology (ICT):** In this review article it refers the Information Technology (IT) more particular term that emphasizes the function of unified communications and telecoms convergence.

The Information and Communication Technology is networking of computer and technological devices gave birth to Information Communication Technology, as scientific, technological engineering disciplines and management technologies used in information handling and processing their application, computers and their interaction with men and devices associated with social, cultural and economic matters.

Information And Communication Technology of the mosaic of technologies products and some techniques have combined to providing a new electronic dimension to the information management that is what the Information and communication Technology which used to cover collection, processing and transmission of information in all the areas of education. Information and Communication Technology (ICT) Information and Communication Technology are the digital process of sharing and utilization of information by use of electronic devices, which comprises the storage, retrieval, transmission and conversion of the information.

- **Information and Communication Technology (ICT) based learning:** ICT based is the anytime anywhere learning using of technological tools. A varied range of technical tools and resources used to communicate, generate, disseminate, save, and manage information is referred to as ICT-based learning. Computers, the Internet, radio and television transmission, and telephone are examples of these technologies. Instruction can be static or interactive in ICT-based learning.
- **Conventional method of learning**: This traditional teaching technique entails lecturers imparting knowledge to students through explanations mixed with questions from the

professors and responses from the students. This term will be used in this study to refer to the teaching using chalk and board for teachers; pen and paper for students. Rather the teacher uses other methods such as demonstration using examples, lecture methods, question answer methods among others.

- **Academic achievement**: It refers to a student's ability to accomplish success, or the degree to which he or she has met pre-determined academic objectives in terms of particular goals and objectives. And here the academic achievement refers to achievement of students in science subject.
- **Attitude towards ICT based learning**: It is an inner feeling of an individual in which a person feels or believes in particular aspects. It is defined in the current study as an attitude toward an ICT-based teaching approach characterized by dimensions such as Cognition, Affection, and Behavior.
- **Students of class ix**: Here the pupils who are studying in class ix including the boys and girls and between the age group ranging from 14 to 15 years old.
- **Gender:** Both Boys and Girls were taken for the study.

Methodology: In this study researcher used the experimental method to study the effectiveness of information communication technology (ICT) in learning science at secondary level, on academic achievement of the students. The independent variables are manipulated and applied to dependent variables to measure their effect on the learning of science subject.

Objective: TodeterminetheeffectivenessofInformationandCommunicationTechnologyinlearningsciencebythestudentsofsecondaryschools.

Tools for Active learning: Tools used for the study were Achievement-test and Attitude Scale. Interactive boards, Video projection units, Microscopes connected to computers, Spreadsheets prepared to capture and model data, CD- ROMs etc. were the tools that can examine calculate and analysis of information, thus providing a platform for student inquiry, analysis and construction of new information.

Data Analysis and Interpretation

The comparison between pre-test and post-test in two groups with respect to scores of pre-test and post-test scores of academic achievement in science and its components of secondary school students in two groups (experimental group and traditional group) The means of pre-test and post-test scores of scores of pre-test and post-test scores of academic achievement in science and its components of secondary school students in two

groups(experimental group and traditional group)by using dependent t-test and the results are presented in the following section.

Null Hypothesis: No significant difference between pre-test and post-test scores of academic achievement in science and itscomponents(Physics subject , Chemistry subject and Biology subject)of secondary school students in experimental group.

To test the above null hypothesis, the dependent or paired t-test was applied and the results are presented in the following table 1.

Table-1:Results of dependent or paired t-test between pre-test and post-test scores of academic achievement in science and its components(Physics, Chemistry and Biology) of secondary school students in experimental group.

Subject	Test	Mean	SD	MeanDiff.	SDDiff.	df	Paired|t|	P-value
Science	Pretest	24.29	7.74					
	Posttest	40.14	5.78	-15.86	3.53	20	20.6124	<0.05,S
Physics	Pretest	8.19	2.80					
	Posttest	12.05	2.22	-3.86	1.90	20	9.2791	<0.05,S
Chemistry	Pretest	8.81	2.89					
	Posttest	14.00	2.37	-5.19	2.82	20	8.4296	<0.05,S
Biology	Pretest	7.29	3.18					
	Posttest	14.10	3.70	-6.81	3.04	20	10.2532	<0.05,S

The results of the above table1 represents dependent or paired t-test between pre-test and post-test scores of academic achievement in science and its components (Physics subject, Chemistry subject and Biology subject)of secondary school students in experimental group. Table 1 clearly showed the following calculated values ie,

- The calculated value of t-test is 20.61 and the critical value of t with 20 degree so freedom at significance level of 5percent is 2.86. The results showed that, the calculated value of t-test i.e.20.61is greater than 2.86.Itmeansthat,the pre-test and post-test achievement scores in Science are similar in experimental group. Therefore, the Null Hypothesis is rejected and Alternative Hypothesis is accepted. It was concluded that, the post-test achievement scores in Science of secondary school students are significantly higher and improvement as compared to post-test achievement scores in Science of secondary school students in experimental group.

- The calculated value of t-test is 9.28 and the critical value of t with 20degree so f freedom at significance level of 5 percent is 2.86.The results showed that, the calculated value of t-test i.e.9.28 is greater than 2.86 It means that, the pre-test and post-test achievement scores in Physics subject of secondary school students are similar in experimental group. Therefore, the Null Hypothesis is rejected and Alternative Hypothesis is accepted. It was concluded that, the post-test achievement scores in Physics subject significantly higher and improvement as compared to post-test achievement scores in Physics subject of secondary school student in experimental group.
- The calculated value of t-test is 8.43 and the critical value of t with 20 degrees of freedom at significance level of 5 percent is 2.86. The results showed that, the calculated value of t-test i.e.8.43 is greater than 2.86 It means that, the pre-test and post-test achievement scores in Chemistry subject of secondary school students are similar in experimental group. Therefore, the Null Hypothesis is rejected and Alternative Hypothesis is accepted. It was concluded that, the post-test achievement scores in Chemistry subject significantly higher and improvement as compared to post-test achievement scores in Chemistry subject of secondary school students in experimental group.
- The calculated value of t-test is 10.25 and the critical value of t with 20 degrees of freedom at significance level of 5percent is 2.86. The results showed that, the calculated value of t-test i.e.10.25 is greater than 2.86 It means that, the pre-test and post-test achievement scores in Biology subject of secondary school students are similar in experimental group. Therefore, the Null Hypothesis is rejected and Alternative Hypothesis is accepted. It was concluded that, the post-test achievement scores in Biology subject significantly higher and improvement as compared to post-test achievement scores in Biology subject of secondary school students in experimental group.

Null Hypothesis: No significant difference between pre-test and post-test scores of academic achievement in science and its components (Physics subject , Chemistry subject and Biology subject) of secondary school students in traditional group.

To test the above null hypothesis, the dependent or paired t-test was applied and the results are presented in the following table 2.

Table-2: Results of dependent or paired t-test Comparison between pre-test and post-test scores of academic achievement in science and its components (Physics, Chemistry and Biology) of secondary school students in traditional group

Subject	Test	Mean	SD	Mean Diff.	SD Diff.	D f	Paired|t|	P-value
Science	Pretest	26.05	8.95					
	Posttest	26.50	9.95	-0.45	2.89	19	0.6958	0.4950,NS
Physics	Pretest	8.80	2.98					
	Posttest	8.10	3.14	0.70	1.81	19	1.7302	0.0998,NS
Chemistry	Pretest	9.25	3.11					
	Posttest	10.05	4.51	-0.80	2.46	19	1.4530	0.1625,NS
Biology	Pretest	8.00	3.55					
	Posttest	8.35	3.28	-0.35	1.23	19	1.2769	0.2170,NS

The results of the above table 2 represents dependent or paired t-test between pre-test and post-test scores of academic achievement in science and its components (Physics subject , Chemistry subject and Biology subjects) of secondary school students in traditional group. Table 2 clearly showed the following calculated values ie,

- The calculated value of t-test is 0.69 and the critical value of t with 19 degrees of freedom at significance level of 5 percent is 2.09. The results showed that, the calculated value of t-test i.e. 0.69 is lesser than 2.09. It means that, the pre-test and post-test achievement scores in Science are similar in traditional group. Therefore, the Null Hypothesis is accepted and Alternative Hypothesis is rejected. It was concluded that, no significant improvement in achievements cores in Science of secondary school students after post-test as compared to pre-test in traditional group.
- The calculated value of t-test is 1.73 and the critical value oft with 19 degrees of freedom at significance level of 5 percent is 2.09. The results showed that, the calculated value of t-test i.e.1.73 is lesser than 2.0930. It means that, the pre-test and post-test achievement scores in Physics subject of secondary school students are similar in traditional group. Therefore, the Null Hypothesis is accepted and Alternative Hypothesis is rejected. It was concluded that, no significant improvement in achievement scores in Physics subject of secondary school students after post-test as compared to pre-test in traditional group.
- The calculated value of t-test is 1.09. The results showed that, the calculated value of t-test i.e.1.45 is lesser than 2.09. It means that, the pre-test and post-test achievement scores in Chemistry subject of secondary school students are similar in traditional group. Therefore, the Null Hypothesis is accepted and Alternative Hypothesis is rejected. It

was concluded that, no significant improvement in achievement scores in Chemistry subject of secondary school students after post-test as compared to pre-test in traditional group.

- The calculated value of t-test is 1.27 and the critical value of t with 19 degrees of freedom at significance level of 5 percent is 2.09. The results showed that, the calculated value of t-test i.e.1.27 is lesser than 2.09. It means that, the pre-test and post-test achievement scores in Biology subject of secondary school students are similar in traditional group. Therefore, the Null Hypothesis is accepted and Alternative Hypothesis is rejected. It was concluded that, no significant improvement in achievement scores in Biology subject of secondary school students after post-test as compared to pre-test in traditional group.

Findings of the study:

- The post-test achievement scores in Science of secondary school students are significantly higher and improvement as compared to post-test achievement scores in Science of secondary school students in experimental group.
- The post-test achievement scores in Physics subject significantly higher and improvement as compared to post-test achievement scores in Physics subject of secondary school student in experimental group.
- The post-test achievement scores in Chemistry subject significantly higher and improvement as compared to post-test achievement scores in Chemistry subject of secondary school students in experimental group.
- The post-test achievement scores in Biology subject significantly higher and improvement as compared to post-test achievement scores in Biology subject of secondary school students in experimental group.
- No significant improvement in achievement scores in Science of secondary school students after post-test as compared to pre-test in traditional group.
- No significant improvement in achievement scores in Physics subject of secondary school students after post-test as compared to pre-test in traditional group.
- No significant improvement in achievement scores in Chemistry subject of secondary school students after post-test as compared to pre-test in traditional group.

- No significant improvement in achievement scores in Biology subject of secondary school students after post-test as compared to pre-test in traditional group.

Discussion and Conclusion

Here the discussion and conclusions are made, that the ICT offers new way of teaching strategies in the class room. It focuses on each and every child learner styles and preferences. ICT in class room saves the time in lesson planning and administration. It offers a more comprehensive approach to assessment. It reduces bureaucratic burden on teachers and allows in dependent learning in a class room. It helps to develop collaborative and team working skills which motivates and engage the students in teaching learning process. Thus the above scores of Experimental group which describes the using of ICT was found to be more effective than as compared to the Control group using traditional method.

References:

Alharbi, E. (2014). *A Study on the Use of ICT in Teaching in Secondary Schools in Kuwait.* Kuwait: Phd unpublished thesis, Cardiff school of Education, Cardiff Metropolitan University.

Bingimilas,K.A.(2009). 'Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature'. *Eurasia journal of mathematics, Science &technology*, 5(3), 235-245. Retrieved from http://ejmste.com/articles

Bravo, M. V. R. &Mogrovejo, P. X. C. (2016). Design of a didactic guide on the Edmodo platform based on online activities for improving the listening and writing skills in the second year of tourism at the Sudamericano institute (Master's dissertation, http://dspace.ucuenca.edu.ec/handle/123456789/26279

Hall, J., Chamblee, G. & Hughes, T. (2008). Teacher perceptions of interactive whiteboards: A comparison of users and future-users in high school and middle school mathematics. In K. McFerrin et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2008* (pp. 4461-4467). Chesapeake, VA: AACE.

Hill, J. R., Reeves, T. C., Heidemier, H., Grant, M., & Wang, S. K. (2000). The impact of portable technologies on teaching and learning: Year one report. Athens academy laptop evaluation. Athens: University of Georgia. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.546.9790&rep=rep1&t ype=pdf

Lazarus Makewa, Maremo J. & et al. (2013). ICT in secondary school administration in rural southern Kenya: An educator's eye on its importance and use. *International Journal of Education and Development using Information and Communication Technology* , Vol. 9No.2-2013

Swan, K., Schenker, J. &Kratcoski, A. (2008).The Effects of the Use of Interactive Whiteboards on Student Achievement. In J. Luca & E. Weippl (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2008* (pp. 3290-3297). Chesapeake, VA: AACE.

Yousef, A. B. and Dahamini, M. (2008). The Economics of E- Learning: The Impact of ICT on Student Performance in Higher Education: Direct Effects, Indirect Effects and Organizational Change (http://rusc.uoc.edu, downloaded March 4, 2021)

Paper Received : 8th December, 2021
Paper Reviewed : 26thDecember, 2021
Paper Published : 1st January, 2022