ROLE OF ICT ORIENTED TEACHING-LEARNING IN CHEMISTRY FOR DIGITAL AGE STUDENTS

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Abstract

The use of ICT in teaching-learning process is a familiar process today. ICT based methodology helps students in : E-learning, e-communication, quick access to information, online student registration, online advertisement, reduced burden of keeping hardcopy, networking with resourceful persons, etc .This empirical study aimed at finding out the probability of ICT methodology to make teaching- learning effective in higher institutions in Kerala. A survey was employed and in order to empirically investigate the study. The findings of this study revealed that students and teachers had a strong desire to integrate ICT into teaching-learning processes. To identify the usefulness of ICT oriented methodology, the investigators adopted pre test and post test based on un equivalent group design. The sample consisted of 68 degree students from different colleges under the University of Calicut, Kerala. The effectiveness of the methodology is identified by comparing the pre test and post test mean scores using t-test. The result shows that ICT oriented methodology is superior to existing strategy of chemistry learning.

Key words: ICT, t-test, control group, experimental group

Introduction

Instructive is a topic that has captivated and fascinated a few scholastics and specialists over the globe in the recent years. Most of these scholastics are the ones who are interested in teaching at the level of advanced education. The conventionally took after worldview of academic organization in advanced education, which is the beneficiary of the medieval model, is that of the teachers' flexibility of decision. This often results in the absolute autonomy of the teachers and furthermore prompts a methodology in view of authority-based and disciplinary teaching. Although this pattern has uncovered itself to be a relatively efficient one in the context of students from the elite section, it bombs drastically in a multicultural and a 'massified' system. In the latter case, it all the time represents a sheer waste of time and assets.

Throughout the years, the conventional academic pattern has witnessed a few significant changes essentially because of two fundamental factors-(a) democratization/'massification' of advanced education and (b) rising requests with respect to the aptitudes of graduates. To the extent the methodology of teaching is concerned, it is vital that the teaching-learning worldview must develop towards more student-centered methodologies, where the student is an active constituent in adapting, appropriately guided and accommodated by competent, capable and committed tutorial support. In this context, one cannot disregard or deny the gigantic potential and part of Information and Communication Technologies (ICT), and particularly that of the Internet (**1**). With an admirable shift from a universe of atoms to a universe of "bits" (**2**), we have been proclaimed into an 'information society' which continuously extended itself through the development of computer networks.

The variations brought about by the application and integration of ICT in the instructive pattern, impacts not just the teacher but likewise the student. It requests that both (teacher and student) interact in different

environments and subjects, share learning, construct new relationships, assemble and separate information, modify it within new spaces, in differentiated implications and with new types of organization. Such a novel proposition in the field of education includes an inherent and a significant change, not just in the manners by which teaching and learning take put, but likewise in the way of thought and information. The effectively established configurations in the zone of teaching practice have altered, together with the distribution of time and space, now associated with the utilization of educational strategies supported by technologies that patch up and open up the measurements of proficiency and quality in educational procedures. One should note that an involvement of ICT may result in an intrinsic change in the part and activity of the teacher and the student. Be that as it may, the genuine need of the time is an evolution in the very texture of the existing educational culture. The predominant educational culture must advance and mature to that of collaborative getting the hang of, trying to conquer the individualistic matrix through social action, whether it is from the perspective of interaction or representation. In such manner, there is still much to be done within the culture of the universities.

Like a social software that gives striking prospects to constructing collaborative learning environments, the remote networks permit flexibility in forming and setting up learning environments where required. Mixed learning alludes to connecting eye to eye teaching and learning with ICT i.e. different approaches to mix up close and personal teaching and different online tools. As per Garrison and Kanuka (**3**) , the most basic model of mixed learning "is the thoughtful integration of classroom vis-à-vis learning encounters with web based learning encounters" going for taking advantage of a synchronous up close and personal situation and the non concurrent, text-based Internet. In reality, this alludes to traditional eye to eye teaching or lecturing with additional online materials and learning assignments. K.se (**4**) gives a further developed and adroit method for utilizing mixed learning by connecting the possibilities of eye to eye situation and online environments in a few ways, both simultaneously and non-simultaneously. K.se additionally takes advantage of different social software as tools for giving possibilities to deliver material, demonstrate their insight and to communicate. Students in the twenty-first century digital age are quite acquainted with social software. Thus, from the point of perspective of mixed learning, social software gives interesting opportunities to support collaborative learning (**5**). Another strikingly useful aspect is that the accessibility and online use of social software does not expect one to install a particular software.

Theories of collaborative learning point to the fact that students' remarkable interpretations and thoughts, approaches to understand and furthermore the assets delivered by student bunches are vital for picking up, causing cognitive conflicts, locating information holes and giving possibilities to students' appropriation (**6,7**). One is better ready to capture these one of a kind thoughts with the assistance of social software. This can likewise be utilized for further learning and talk. We call this propelled approach Blended Learning 2.0. Moreover,blended learning (2.0) gives interesting possibilities when taking into consideration the manifold ways to utilize versatile technologies. Utilizing versatile technologies helps in the creation of adaptable approaches to support picking up, changing from basic bore and-practice activities to collaborative learning practices (**8**). Versatile technologies (remote connections and portable equipment) additionally empower one to take advantage of different online environments outside traditional computer laboratories, and have contextualized genuine learning encounters supported by technologies (**9**). Utilitarian, Economic, Cultural and Democratic are the four for the most part accepted motives of science education .This naturally requires an essential information in science and technology for voicing one's assessments on such issues and debates. Thus, it is imperative to educate the overall population in science and technology to create and sustain a healthy democratic society (**10**).

Teachers frequently tend to utilize ICT for the most part to assist, augment and complement existing classroom practices rather than to re-shape subject content, objectives and instructional methods. The science education, which is essentially a scientific 'training', accentuates the foundational or vocational aspects of the subject and offers an educational modules that consists of the fundamental concepts of a settled, consensually-concurred science. In Kerala, ICT assumed a key part in conquering the obstructions in the teaching of science up to secondary school level. Unfortunately, the part of ICT bit by bit lessened in methodology and educational modules in advanced education.

The given study highlights the importance of ICT in teaching and learning chemistry in higher institutions. It is explicated based on an overview conducted among both students and teachers. The study likewise reveals insight into the effectiveness of ICT methodology through a correlation of the pre-test and post-test by t-test method.

Objectives

The specific objectives of the study were to:

□□□□□determine the influence of ICT to make teaching-learning effective in higher institutions, especially selected colleges under University of Calicut, Kerala.

□To test the effectiveness of ICT oriented methodology and instructional design in the achievement among Chemistry students.

Methodology

The target test of the study was 90 students and 75 teachers. The example was selected utilizing stratified arbitrary inspecting technique from five selected higher institutions of learning under university of Calicut, Kerala. A questionnaire was outlined and contained direct questions yes/no and multiple decision items. Out of this, 101 (61.2%) completely completed questionnaires were returned, of which 70 (77.8%) were filled by students and 31 (41.3%) by teachers respectively. This gave a reaction rate of 61.2%. The examination was done at the institutional level. Chi square test and weighted normal were utilized to examine and interpret the data. Experimental method was adopted to test the effectiveness of ICT methodology. The outline selected for the experiment was the pre test – post test – two gathering plans.

Analysis and interpretation of data

The use of ICT to make teaching-learning effective in higher institutions have been presented in the following table ;

	Description	SA	A	U	D	SD	WA	χ^2	Sig.Value
1	Less number of slots is in existing curriculum where we can implement ICT methodology	24 (34.3)	34 (48.6)	7 (10.0)	5 (7.1)	0 (0.0)	4.10	33.200	.000
2	Hard spot areas of the subjects are more likely to be communicated through ICT	37 (52.9)	24 (34.3)	5(7.1)	2 (2.9)	2 (2.9)	4.31	71.286	.000
3	Teacher's computer skill along with students could develop new software which is likely to be effective in solving hard spot areas	25 (35.7)	25 (35.7)	17 (24.3)	3 (4.3)	0 (0.0)	4.03	18.457	.000
4	Teachers' computer self-efficacy has greater effect in teaching learning	25 (35.7)	25 (35.7)	14 (20)	6 (8.6)	0 (0.0)	3.99	14.866	.002
5	Teachers' gender differences influence use of ICT in	20 (28.6)	16(22.9)	15 (21.4)	9 (12.9)	10 (14.3)	3.39	5.857	.210

	teaching								
6	Higher institutions should replace the traditional teaching aids by new ICT tools to improve the teaching-learning.	36 (51.4)	19 (27.1)	7 (10.0)	5 (7.1)	3 (4.3)	4.14	54.286	.000
7	Training for teachers and students is essential to get more awareness in search engines thereby reducing the difficulties in learning corresponding to their own study area.	33 (47.3)	21 (30.0)	11 (15.7)	3 (4.3)	2 (2.9)	4.14	48.857	.000

***Table 1**: Opinion of students regarding the probability of using ICT methodology in higher institutions*

ICT oriented methodology in chemistry

The investigators prepared an achievement test in chemistry for the topic stereochemistry . ICT based discussions were included in learning process by providing slots for electronic discussion and sharing in unit plan.Two independent samples were selected from chemistry degree students of kerala as experimental group and control group. 34 students were included in both groups. All the members of experimental group had the awareness for using ICT methodology.

Achievement test were conducted to both the experimental group and control group as pretest. Then, learning through ICT methodology was provided to experimental group. At the same time, normal teaching as given to control group. Achievement test were again conducted to both group as post test and analysed base on following points.

Comparison of pre test in both groups by using the test of significant difference between means.

Comparison of post test in both groups by using the test of significance of the difference between means.

Test the effectiveness of ICT methodology and existing methodology with respect to chemistry achievement test

	N	Mean	SD	t- value	Level of significance
Experimental group	34	7.93	3.63	0.86	Not significant
Control group	34	7.52	3.45	0.86	Not significant

Table 2. Data of pre test in two groups

	N	Mean	SD	t-value	Level of significance
Experimental group	34	21.88	4.78	3.17	Significant

Control group	34	18.1	5.04	3.17	Significant

Table 3. Data of post test in two group

Results and discussion

All statements, except statement 5, in Table 1 have sig. estimation of under .05. Therefore, it was statistically significant to state that students are strongly concur that utilization of ICT to make teaching-learning effective in higher institutions of learning except the teachers‟ sex difference which had a significant estimation of greater than 0.05 which isn't statistically significant. It was discovered that most of the respondents strongly concurred that ICT is fundamental in teaching– learning process. The discoveries of this study indicate that teachers have strong want for the integration of ICT into education. From Table 2, the obtained t-esteem (0.86)is beneath the limit set of 0.05 level of importance. So no significant difference is discovered the mean pre test scores for achievement in Chemistry of experimental and control group. Table 3 demonstrates that the obtained t-esteem (3.17) is over the limit set for 0.05 level of importance. So there exist a significant difference between the mean post test scores both groups. Henceforth the experimental group is better than control group.

CONCLUSION

From investigate discoveries and exchanges on the part of ICT to make teaching-learning effective in higher institutions obviously suggests that arrangement for transformation and for ICT Support education is inevitable. More ICT tools ought to be given to each higher institution, Motivation and compensating teachers to utilize ICT and Transformation of positive attitudes towards ICT into efficient far reaching practice .The discoveries of this study indicate that students have strong want for the integration of ICT into education. Teachers are to be persuaded of the benefit of utilizing ICT in their teaching-learning process. From the study it was discovered that ICT based methodology of learning is effective in learning Chemistry and can enhance the quality of education.

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Supplementary table

No.	**Questions**
1	Draw staggered confirmation of ethane
2	Draw eclipsed confirmation of ethane
3	Why staggered confirmation is stable
4	In which mechanism(SN_1 or SN_2) inversion of the structure happens and why
5	Explain dextro and levo rotator by taking any example
6	Explain geometrical isomerism of 2-burene
7	Distinguish racemisation,inversion and retention
8	Give explanation of dipolemoment of cis and trans butene

Table 4.Questions used for the achievement test