

Educational Technology and Constructivism

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Abstract

At present our educational system is focussing on holistic development of students and to accomplish the task teacher and student need to develop the ability to critique. “A child constructs his / her knowledge in the process of learning. Allowing children to ask questions that require them to relate what they are learning in schools to things happening outside, encouraging children to answer in their own words and from their own experiences, rather than simply memorising and getting answers right in just one way- all these are small but important steps in helping children develop their understanding” (NCF 2005). ICT develops an ability to critically choose between the ample amount of data which is available on the net. Through ICT one may be more capable of critically analyse and converting different information and data collected through various sources as a meaningful source of learning. In such a situation the teacher helps children to construct their knowledge and teacher only facilitates. The present paper is an attempt to explore to what extent teachers at elementary level are using/ practising ICT to promote constructivism in the classroom.

Key words: Educational Technology, constructivism, teaching- learning process

Introduction

Today is an era of technological advancements in all walks of life, be it practical operations, policy making, training of personnel or teaching learning processes. “ICT enabled education, to great extent, can combat many problems ” (Ilyas& Bhatia 2017) . Digital era is the substitute of solutions to various day today problems. The access of material/ information, classifying and arranging the data sequentially for meaningful purposes has become essential part of human life either as an individual or a member of of an organisation. The Educational institutions are using Information and Communication Technology for digital learning through the use of computer, CD Roms, DVDs, mobile technology and MOOCS etc. These technologies will also include“ processes for digitisation, deployment and management of content, development and deployment of platforms and processes for capacity development and creation of forums for interaction and exchange” (National Policy on ICT in School Education 2013).Starting with enrolling students in the educational institutions, using digital resources for teaching learning, providing learners an opportunity to present their assignments and research synopses, evaluation, providing feedback through WhatsApp and email and declaring the results are essential features of almost all the educational institutions across the globe. ICT may be used for effective evaluation. The students may get instantaneous feedback about the status of his understanding and if the answer is wrong, then he / she can

get the correct answer(Sansanwal, 2009). Schools are the most vibrant users of educational technology in teaching of and use by their teachers as well as students. ICT has a potential tool to transform the raw material into a meaningful learning outcome. ICT provides variety in the presentation of content which helps learners in concentration, better understanding and longer retention of information which otherwise is not possible. The National Curriculum Framework 2005 (NCF, 2005)clearly highlights the importance of ICT in school education “in order to inculcate requisite skills in the students, affordable ICT tools and techniques should be integrated into teaching learning process right from the primary stage”.

ICT is used worldwide to increase access to, and improve the relevance and quality of education. Geographical distance is no longer an obstacle to obtaining education. Today’s teacher is no longer to rely solely on the printed books which are housed in the libraries for their educational requirements.“The advancement in ICT , no doubt has led to globalisation in all walks of life. One of the positive effects of this world wide connectivity is that internet ‘meetings’ and online conferencing’ is possible .“Today’s teacher and student need to be adept in the language of technology, only then s/he will be in a position to stay abreast with the modern time”(Husain & Nair 2016).

Multiple resources are abundant on the internet such as; visual presentation, video clips, sounds, and so on and through these resources knowledge can be acquired”(Shan Fu 2013).

Multimedia education provides a framework and pedagogy for the new literary needs for living and citizenship in the 21st century. Moreover it paves the way to mastering the skills required for lifelong learning in a constantly changing world” (Shipra Srivastava 2017-18). With fast technological advancement a variety of tools and techniques of ICT are prevalent in the classroom instruction and are being updated year after year. “A teacher who is still relying on the conventional modes of teaching learning is lagging behind in shaping the personality of his students. In the constructivist perspective, learning is the process of the construction of knowledge. Learners activity construct their own knowledge by connecting new ideas on the basis of materials/ activities presented to them (NCF 2005).

Teachers have the challenges of dealing with students who are coming to school more literate in the new literacies of ICTs sometimes even more than their teachers. Thus teachers need to rethink their role in an educational context that is constantly changing with resources and tools where learners are familiar with using tools inside and outside” (Lankeshear & Knobel, 2011).

The scenario in classroom teaching has gone sea change, evolving the role of teacher as a facilitator in contrary to the earlier days when the teacher supposed to be the major knowledge provider only. Teaching was by and large teacher centric in those days. In today’s context technology has brought the children in the forefront in classroom. The students in classroom is supposed to be a guided by the teacher to construct his/ her knowledge and the teacher has to facilitate them to take full advantage of the computer and other learning resources. There is a dynamic process between teacher and child in the construction of knowledge. ICT in this process may provide opportunity a learner to become critical thinker, problem solver, information literate citizen, knowledge manager and finally the members who are proficient in collaborating with others. (Ilyas 2017).

Need of the study

However, the researcher was apprehensive about the use of constructivist approach of teaching in the classroom. Although ICT is cited to be a major source of meaningful learning outcome universally but this is not the case in the Indian context. Judy Hobson(2009) quotes “.....in countries like Denmark, to be precise, students take exams with full access to internet”. In our country, the ground reality is completely different. The researcher therefore undertook a research project to investigate as to what extent the teachers are facilitating higher order thinking and infusing effective learning outcome at elementary level by using ICT. The investigator also wants to know the attitude of teachers towards the use of ICT in classroom for the better understanding of children the various subjects and to develop among them the capacity to create knowledge with their own efforts, when teacher acts merely as a facilitator. National Curriculum Framework 2005 emphasises constructivism and recommends that curriculum should help learners to become constructor of knowledge and emphasises active role of teachers in relation to the process of knowledge construction according to which the books are developed. Constructivist process orientation to teacher is essential to develop different thinking skills.

Objectives of the Study

1. To study the level of use of ICT to facilitate students for construction of knowledge.
2. To study and compare the attitude of male and female teachers at elementary level towards the use of ICT as a potential tool to help students create their own knowledge.
3. To study and compare the attitude of teachers below 10 years of experience and above 10 years of experience at elementary level towards the use of ICT as a potential tool to help students create their own knowledge.
4. To study the impediments in using ICT in classroom at elementary level.

Hypotheses- The following Null hypotheses will be tested:

1. There is no difference between the attitude of male and female teachers towards the use of ICT as a potential tool for construction of knowledge by students.
2. There is no difference between the attitude of teachers below 10 years and above 10 years of teaching experience towards the use of ICT as a potential tool for construction of knowledge by students.

Methodology

Population: The population of the present study is all the teachers of schools teaching at elementary level.

Sample: The researcher randomly selected 100 teachers teaching at elementary level south Delhi schools in the following manner:

Firstly out of the total 100 teachers, 54 teachers having a teaching experience below 10 years and 46 teachers having an experience of above 10 years were selected. Secondly the researcher tried to select equal number of male and female teachers but could select only 42 male and 58 female teachers teaching at elementary level. So the following constitutes the sample:

Category	Number	Category	Number
Male	42	Below 10 years	54
Female	58	Above 10 years	46
TOTAL	100		100

Tools for Data Collection:

A five point scale was developed by the researcher based on statements with the options such as;

Strongly Agreed (SA), Agreed (A), Undecided (UD), Disagreed (DA) and Strongly Disagreed (SDA) to study the attitude of the teachers. The scale was divided into four dimensions. Total 39 items were framed dividing in 4 dimensions and were given to the experts for the validation of the scale. The experts discarded 12 items and the researcher retained only 27 items.

The dimensions are as follows:

	Number of items
Use of ICT tools in teaching learning process	6
Teachers' role to project ICT in learning for students	5
Attitude of teachers for ICT as a tool for constructivist approach	10
Impediments in the use of ICT	6

The instruction was given to the teachers to give their own opinion not to be influenced by others.

Analysis of the data- Analysis of the data have been shown as follows:

Use of ICT in teaching Learning

The detailed analysis of the related to the use of ICT and related devices by male and teachers among the sampled teachers is given in the table given below:

Table:1 Use of ICT in teaching Learning

Use of ICT in Teaching Learning	Gender	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Male	42	4.3100	.17573	.07174	.686	.508
	Female	58	4.4050	.29016	.11846		NS

P > 0.05 and 0.001 Not significant

Table 1 shows that mean $\pm$ S.E. and S.D. of male and female participants in using of ICT in teaching learning are 4.31 ± 0.07 and S.D. = 0.175, $4.41 \pm .118$ and S.D. = 0.29 i.e. both groups are homogenous in nature. The mean difference between male and female in using of ICT in classroom teaching learning process is $t=0.686$, $p>0.05$ and 0.001, which indicates the male and female teachers have no significant difference in using ICT in teaching learning process.

Teachers' Role to Project ICT to Promote Constructivism

Table: 2 Teachers' Role to Project ICT to Promote Constructivism

Teachers' role to Project ICT to Promote Construction	Gender	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Male	42	4.3080	.25685	.11487	1.645	.139
	Female	58	4.0900	.14782	.06611		NS

$p>0.05$ and 0.001 not significant

Table 2 represents the mean $\pm$ S.E. scores and S.D. of Male and female teachers regarding the their role to project ICT in promoting constructivist approach of teaching and learning are $M \pm S.E. = 4.31 \pm .114$ and S.D.= 0.148, $M \pm S.E. = 4.09 \pm .066$ and S.D.= .148 respectively, which indicates that both groups are homogenous in nature. The mean difference between male and female teachers' viewpoints was different. However, mean difference is not found significant i.e. $t=1.645$, $p>0.05$ and 0.01.

Attitude of Teachers towards ICT as a better tool for constructivism

Table: 3 Attitude of Teachers towards ICT as a better tool for constructivism

Attitude of Teachers towards ICT as a better tool for constructivist approach	Gender	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Male	42	4.5330	.22420	.07090	2.316	.033*
	Female	58	4.1270	.50693	.16031		

*P< 0.05 significant at 0.05 level

Table 3 shows the attitude of teachers towards ICT as a better tool for constructivist approach in classroom teaching and learning. The mean $\pm SE$ and S.D. of male and female teachers are $4.53 \pm .071$, S.D= 0.22 and $4.53 \pm .16$, S.D. = 0.51 respectively. The mean difference between male and female attitude towards ICT as a better tool for constructivist approach of teaching and learning is $t= 2.316$, $p=0.033$ which is found significant at 0.05 level. It means that the attitude of male and female teachers differs regarding use of ICT as a potential tool for constructivist approach in teaching and learning.

Based on years Teaching Experience

Table: 4 Use of ICT in Teaching Learning

Use of ICT in Teaching Learning	Teaching Experience	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Below 10 years	54	4.5494	.25758	.10516	3.516	.006**
	Above 10 Years	46	3.6703	.55567	.22685		

**p<0.05 and 0.01 significant at 0.05 and 0.01 level

Table 4 shows, mean $\pm S.E.$ and S.D. of below 10 years and above 10 years of teaching experienced teachers in using of ICT in teaching learning are 4.55 ± 0.105 , S.D. = 0.257 and $3.67 \pm .226$ and S.D. = 0.55 i.e. respectively. The difference between below 10 years and above 10 years of teaching experienced teachers in using of ICT in classroom teaching learning process is $t=3.516$, $p=0.006$ i.e. which is significant at both level at 0.05 and 0.01.

It means below 10 years of teachers using ICT more than above 10 years of teaching experienced teachers.

Teachers' role to project ICT to Promote constructivism

Table: 5 Teachers' role to project ICT to Promote constructivism

Teachers' role to project ICT to Promote constructivism	Teaching Experience	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Below 10 Years,	54	3.9815	.42269	.18903	.126	.903
	Above 10 Years	46	3.9522	.30528	.13652		NS

P > 0.05 and 0.001 Not significant

Table 5 represents the mean± S.E. scores and S.D. of viewpoints of below 10 years and above 10 years of teaching experienced teachers regarding the their role to project ICT in promoting constructivist approach of teaching and learning which are 3.98±.189, S.D.= 0.422 and 3.95± .136, S.D.= .305 respectively. It indicates that both the groups are homogenous in nature. The mean difference between below 10 years and above 10 years of teaching experienced teachers on this aspect is not significant i.e. t=.126, p> 0.05 and 0.01. So the null hypothesis that 'there is no significant difference between more experienced (above 10 years) and less experienced teachers (below 10 years) is accepted.

Attitude of teachers towards ICT as a better tool for constructivism

Table: 6 Attitude of teachers towards ICT as a better tool for constructivist approach

Attitude of teachers towards ICT as a better tool for constructivist approach	Years of Teaching Experience	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. (2-tailed)
	Below 10 Years,	54	4.1093	.39894	.12616	.111	.913
	Above 10 Years	46	4.0870	.49286	.15586		NS

P > 0.05 and 0.001 not significant

Table 6 shows the attitude of teachers towards ICT as a better tool for constructivist approach in classroom teaching and learning.

The means±SE and S.D. of below 10 years of teaching experience and above 10 years teaching experienced teachers are 4.12 ± .126, S.D= 0.398 and 4.08 ±.155 S.D.= 0.49 respectively which shows both groups are homogenous in nature. The significant mean difference between below 10 years and above 10 years teachers' attitude towards ICT as a better tool for constructivist approach of teaching and learning is t= .111, p>0.05 and 0.01 i.e. which is not significant at any level. So the null hypothesis that 'there is no significant

difference between more experienced (above 10 years) and less experienced teachers (below 10 years)' is accepted. However, the mean score of below 10 years teaching experienced is better than above 10 years' experienced teachers regarding the use of ICT as a potential tool for constructivist approach of teaching and learning.

Impediments in the use of ICT- The analysis of data on the dimension of impediments is given below. The responses of the respondents regardless of the experience of teaching and the gender have been given in the tabular form followed by graphical representation.

Table: 7 Impediments in the use of ICT

S.N.	Items	SA	A	UD	DA	SDA
1	All the time use of digital technology is not possible	77	9	0	7	7
2	It is difficult to handle all the required technology in classroom	74	14	2	8	2
3	Most of e resources are not available	75	10	2	8	5
4	Use of ICT is time consuming	87	2	2	6	3
5	Teachers are not well trained to use many e resources	73	6	3	11	7
6	Teachers prefer conventional mode of teaching than use of ICT	79	5	1	11	4

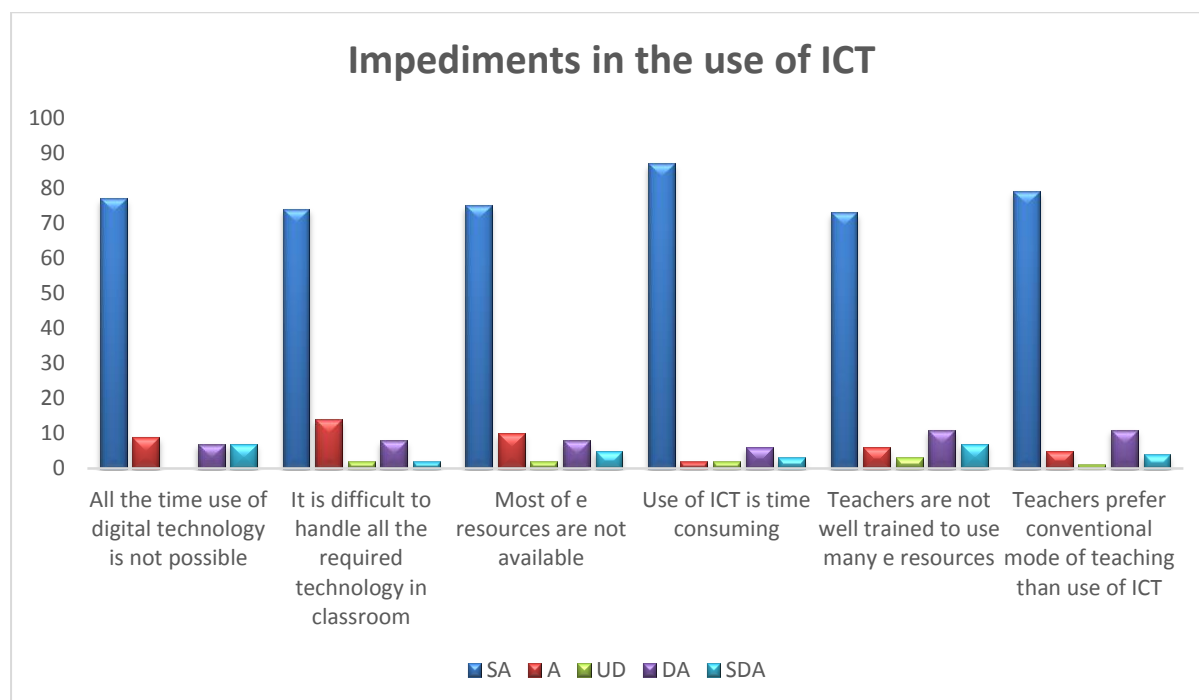


Figure: 1 Impediments in the use of ICT

The figure 1 highlights the impediments in the use of ICT by the teachers for practising constructivism in teaching learning process. The above figure shows that the majority of teachers (77%) strongly agree that the all the time use of digital technology is not possible and 74% of teachers strongly agree that it is difficult to handle all the required technology in classroom. The Majority of the teachers (75%) also strongly agree that most of the e-resources are not available and 87% of teachers strongly agree that the use of ICT is time consuming. The majority of the teachers (73%) strongly agree that teachers are not well trained to use many e-resources to use it for constructivist approach in teaching learning and appropriate amount of training is needed. The majority of teachers (79%) also strongly agree that even today majority of the teachers are using traditional method of teaching than using ICT

Discussion and Conclusion

The findings of the present study are corroborating with the researcher's assumption that in spite of the fact that technology has become an integral part of human life but is failing to project technology as a potential tool of constructivism in teaching learning process. Although teachers, irrespective of gender and experience of teaching, use various digital resources in teaching learning, the females are showing better performance but both are failing to develop among children high order thinking skills even with various tools of technologies. Experience however does not play any significant role, more experienced group of teachers in the sample has played dismal role in projecting ICT as a tool to promote constructivism, in comparison to the youngsters who are doing well. This situation warrants that the management should organise professional development programmes with frequent interval and educational technology should be emphasised. The attitudinal differences were noticed between the males and females towards ICT as a potential tool for constructivism where males' performance is better than the female teachers who in general do not perceive that e- resources can be used to follow constructivist approach in teaching learning. Some of the impediments reported by the teachers in the better use of technological resources also need due attention, predominantly non availability of e resources and non-handling many technology tools which also need to be taken care of. The curriculum should be designed in a way that the use of digital or e-resources is in built component of the curriculum. The teacher should train their children too to use such a technology to connect new ideas to existing ideas thus facilitating them in the construction of knowledge in this dynamic process of teaching learning.

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