

“Intervention of ICT on educational system and its effect on problem solving ability of students”

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Abstract: This paper is based on inferential analysis and it tries to hypothesize the relation between use of ICT as teaching aid and problem solving ability of students. The scores of problem solving ability were taken as indicator to assess the intervention of ICT in educational system. To study the impact of intervention of ICT on educational system, 100 Higher Secondary students from different schools of Raisen were selected. Schools covered both urban as well as rural areas of the district. The students who were facilitated with ICT got teaching through smart boards and pre recorded lectures. These students were well exposed to e world and often surfed internet for the enrichment of knowledge and entertainment. The students comprising the other group was devoid of any smart class, smart boards or pre recorded lectures. Though both groups enjoyed smart phone, television, radio etc for their enjoyment but the second group was unaware of using these ICTs as teaching facilitator. Their problem solving ability was determined with the help of self descriptive questionnaire. It was a pen and paper test having 20 questions with four options. The questionnaire was to be filled within 40 minutes. Results indicated that there was no significant difference in the problem solving ability of students belonging to the two groups. The results also revealed that majority of the observed population of students had average problem solving ability which is a matter of concern. This finds the scope to review the curriculum so that students can improve their problem solving ability along with their routine studies. The role of ICT needs to be reviewed in various dimensions so as to draw its maximum use.

Key words- ICT, problem solving ability and educational system

INTRODUCTION

ICTs and Education: Education has been termed as the only cure as well as the vaccination against all sorrows. Thus it is very necessary that every student should get equal chances and opportunities to be educated. The traditional teacher centered education was gradually replaced by student centered education. With the introduction of computers and modern electronic media, an investigation about the possibility of replacing teacher by computer was done. But very soon it proved to be a too early step to be taken. The present education system demands computer aided education with the teachers playing key instructional roles while interacting with the students. ICT can furnish a better teaching tool for improving teaching learning process by increasing the creative dimensions of the students but at the same time one cannot over look the role of a teacher.

Various forms of ICT:

According to UNDP: ‘ICTs are basically information-handling tools- a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information.

The ‘old’ ICTs include radio, television and telephone, and the ‘new’ ICTs include computers, satellite and wireless technology and the Internet. ICT can be further categorized into Analogue and Digital. Audio visual aids such as the transparency, slides, tape, cassette recorders, radio, video cassettes, television, film etc. come under analogue media while computer and Internet based technologies are called the “digital media”. Together these combine to serve in the field of education.

ICT and Problem Solving Ability: Education plays a vital role in professional as well as emotional skill building in students. These skills help students to face the challenges in their lives. The success of an individual bears a large magnitude on skill of solving the problem that he has practiced in its student life. Thus in the age of technology it is therefore increasingly becoming an integral part of objective of learning that a student should be well updated with latest knowledge and skills. Learning becomes effective when students are guided to act as problem solvers rather than solution seekers. ICT being the biggest data bank for knowledge can be utilized to train students as good problem solvers.

Thus it is expected that ICT blended education can develop the ability to frame problems, communicate effectively, work efficiently whenever challenged to new or unfamiliar situations.

REVIEW OF LITERATURE

Need Observed: Much focus is now being given on inclusion of ICT in educational sector and the impact of inclusion is given the least importance. Moreover the studies carried out were mostly in developed countries. When relation between use of computers and achievement of students was tested, Fuchs and Woessman (2004) found a negative relationship while several other large-scale studies also conducted within the United States found a positive relationship (e.g. Blackmore et al., 2005; National Center for Educational Statistics, 2001). Thus there has always been a lack of clear consensus about the impact of ICT in education in developing countries like India.

RESEARCH METHODOLOGY

The present study is an inferential one that aims at

1. Reviewing the impact of ICT based education on problem solving ability of higher secondary school students on the basis of
 - a. ICT and Non ICT school students.
 - b. Boys studying in ICT and Non ICT schools.
 - c. Girls studying in ICT and Non ICT schools.

To fulfill the above objectives the students have been divided into various groups:

S. No.	Group	Variety	Number of students
1	ICT schools	Students studying in ICT schools.	50
2	Non ICT schools	Students studying in Non ICT schools.	50
3	ICT Boys	Boys studying in ICT schools.	25
4	Non ICT Boys	Boys studying in Non ICT schools.	25
5	ICT Girls	Girls Studying in ICT schools	25
6	Non ICT Girls	Girls studying in Non ICT schools.	25

Based on the above objectives, following hypotheses have been framed to analyze the impact of teaching through ICT resources and traditional or Non ICT resources.

Hypothesis:

1. **H₀**: There is significant difference between the problem solving ability scores of students studying in group A and group B School.
H₁: There is no significant difference between the problem solving ability scores of students studying in group A and group B School.
2. **H₀**: There is significant difference between the problem solving ability scores of boys studying in group A and group B School.
H₁: There is no significant difference between the problem solving ability scores of boys studying in group A and group B School.
3. **H₀**: There is significant difference between the problem solving ability scores of girls studying in group A and group B School.
H₁: There is no significant difference between the problem solving ability scores of girl students studying in group A and group B School.

RESEARCH DESIGN

A combination of both quantitative research and qualitative research has been employed to meet the objectives of the study. Two varieties of schools have been selected to study the impact of ICT based education on problem solving ability of students. One variety of schools was aided with smart class in which computer aided education was imparted and the other variety of schools included teaching through traditional methods. The second variety was least exposed to computers or other e technology. A power test in the form of standardized tool with a short introduction of problem solving ability was distributed to all students.

Sample: Students of higher secondary classes of different schools of Raisen have been taken for the survey work. These students belonged to two varieties of groups. Students belonging to schools that impart teaching including smart classes, computer were assigned under group ICT and Students belonging to schools that don't include teaching through smart classes, computer were assigned under group Non ICT.

Tool: Problem solving ability tool devised by L. N. Dubey was employed to test the problem solving ability of the students. It is a reusable power test having 20 questions to be solved in 40 minutes. The responses were recorded in the score sheet with four options.

Scoring Procedure: The scoring procedure for problem solving ability is based on the values given to each correct response. This is done with the help of scoring stencil.

DATA ANALYSIS AND INTERPRETATION

The responses were obtained in the form of raw data. It has been sorted out, classified and tabulated for further statistical analysis.

Quantitative Analysis

Hypothesis Testing

Hypothesis 1

H₀: There is significant difference between the problem solving ability scores of students studying in ICT and Non- ICT School.

Table-1: Table for t-test between problem solving ability scores of students of ICT and Non ICT schools

Group Statistics					
PSA	Group	N	Mean	Std. Deviation	Std. Error Mean
	ICT	50	6.6800	3.39531	.48017
	Non ICT	50	6.0800	2.83448	.40086

t-test for Equality of Means					
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PSA	.959	98	.340	.60000	.62550

The value of significance $p > 0.05$ shows that there is no variability in the values of two independent sample groups. The t-test for equality of means in the two groups are statistically insignificant, $t(94.971) = .959$, $p > 0.05$. Thus hypothesis 1 is rejected and its alternative hypothesis i.e. "There is no significant difference between the problem solving ability scores of students studying in ICT and Non- ICT School" is accepted.

Hypothesis 2 H_0 : There is significant difference between the problem solving ability scores of boys studying in ICT and Non ICT group School.

Table 2: T-test between problem solving ability scores of boys of ICT schools and Non ICT schools

Group Statistics					
PSA	Group	N	Mean	Std. Deviation	Std. Error Mean
	ICT Boys	25	7.7200	3.40979	.68196
	Non ICT Boys	25	6.1600	3.07788	.61558

t-test for Equality of Means					
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PSA	1.698	48	.096	1.56000	.91869

The value of significance $p > 0.05$ shows that there is no variability in the values of two independent sample groups. The t-test for equality of means in the two groups are statistically insignificant, $t(47.505) = 1.698$, $p > 0.05$. Thus hypothesis 1 is rejected and its alternative hypothesis i.e. "There is no significant difference between the problem solving ability scores of boys studying in ICT and Non- ICT School" is accepted.

Hypothesis 3 H_0 : There is significant difference between the problem solving ability scores of girls studying in ICT and Non ICT group School

Table 2: T-test between problem solving ability scores of girls of ICT schools and Non ICT schools

Group Statistics					
PSA	Group	N	Mean	Std. Deviation	Std. Error Mean
	ICT Girls	25	5.6400	3.10752	.62150
	Non ICT Girls	25	6.0000	2.62996	.52599

t-test for Equality of Means					
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PSA	-.442	48	.660	-.36000	.81421

The value of significance $p > 0.05$ shows that there is no variability in the values of two independent sample groups. The t-test for equality of means in the two groups are statistically insignificant, $t(46.723) = -.442$, $p > 0.05$. Thus hypothesis 3 is rejected and its alternative hypothesis i.e. "There is no significant difference between the problem solving ability scores of girls studying in ICT and Non- ICT School" is accepted.

Qualitative Analysis

It was observed that students who were in first variety of schools were tech savvy too and often used internet as a supplement to their studies. They had their own email id, face book account and often used network to surf various topics. The second variety of students was taught in the traditional instructional method and was not tech savvy.

The group interview revealed that smart classes or boards were often used to show various topics of all subjects. There was no interaction between the student and teacher during smart class period. The topic taken through smart class took almost equal time as compared to the traditional method of teaching. Hence chapter was not explained further due to shortage of time. It was revised through solved exercises.

In case of home assignments students submitted the downloaded subject matter with well designed cover pages having their names beautifully written on it. Thus students were found more engaged in download- cut- paste and submit activity and stressed their brain least to overcome the unknown situations.

RESULTS AND DISCUSSIONS

The quantitative analysis has clearly shown that there is no difference in the achievements observed in students studying in ICT and Non ICT schools. It is evident that the mean value did not cross more than 7.7 that show the poor status of students in terms of problem solving ability. The answer can be obtained from the interview done under qualitative analysis and observation. Both the teaching methods are based on rote learning. There is no option where student is put to test its ability to discover the facts or express its views. Readymade notes are being given even at the higher secondary level. Students are habitual of surfing various subject guides before trying to answer the questions on their own. In short the whole exercise of relieving the students from mental stress is misunderstood. Use of ICT in education should be reviewed in terms of cognitive development of students. Achievement of the students is now being in terms of marks/grades obtained in various evaluations carried out in schools but the method of attaining these marks is being replaced by rote learning instead of problem solving.

CONCLUSION

It is evident from the results of problem solving ability scores that there exists no significant difference between students studying in ICT Schools and non ICT Schools. This is the direct indication for the thorough review of need and importance of ICT in school teaching. We all know that problem solving in a student occurs when he is led to discover the facts. Exerting the mind manually improves the problem solving ability of students. The observation done under qualitative research revealed that the use of ICT done in education is synonymous to the use of calculators where stress on brain was given least. Also these results show that achievement in the form of grades/percentage is kept on top, keeping aside the cognitive or psychomotor development of student. Though the present age is the age of computers and mass media but one should not forget that neither they are our teachers nor they can be replaced as our thought machines. They can be well utilized as data sources or as digital libraries. Problem solving can be improved by putting brain into new challenges every time. Thus the role of ICT should be in the form of challenger and not the problem solver.

The impact of ICT on students should be under the expert guidance of teachers as well as parents. The use of various resources of knowledge should be limited for data collection and not as the medium of replacement of problem solving. The situation may arise when the dependency of students will circulate around these digital gadgets and they may find suffocated and helpless for their survival if these helping tools are not provided when their expectation and need is high. Therefore, we should try to solve the challenges by addressing the outcome and effects and clearly pronouncing the underlying causes.

RECOMMENDATION AND SUGGESTION

Students should be exposed to various situations that test their skills of decision making, PSA, DM, HOT. A guided stress is very necessary for the healthy development of brain. A sense of self evaluation and sustainable learning habit needs to be developed amongst the students. CBSE has started testing PSA but very soon it has been stopped due to some limitations. MPBSE also conducts Pratibha Parv which is appreciable. Achievement of students should be confirmed on the grounds of intellectual, social, emotional development.

AREAS OF FURTHER RESEARCH:

There are very few researches done in the field of evaluating impact of ICT on PSA of students. Research can be further enriched by the following intervention.

1. Reviewing the impact of ICT based education on problem solving ability of students.
2. Finding the scope of blending of education with ICT on the basis of students' PSA, DM and HOT.
3. Exploring the areas of further research to harness the maximum use of ICT in the field of education.
4. Finding the ways of self sustainable learning methods for students.

ABBREVIATIONS

PSA	Problem Solving Ability
DM	Decision Making
HOT	Higher Order Thinking
CBSE	Central Board of Secondary Education
MPBSE	Madhya Pradesh Board of Secondary Education
UNDP	United Nations Development Programme

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