



## EFFECT OF ICT ON STUDENT ACADEMIC ACHIEVEMENT, ACADEMIC MOTIVATION AND STUDENT ENGAGEMENT AMONG 9<sup>TH</sup> CLASS STUDENTS

Amit Kauts Ph.d 1, Namrata Sharma2

<sup>1</sup>Prof&Head, Department of Education, Guru Nanak Dev University, Amritsar

E-mail:amitkauts@gndu.ac.in

<sup>2</sup>Research Scholar Department of Education, Guru Nanak Dev University, Amritsar

Email: snamrata451@gmail.com

Paper Received On: 21 AUG 2023

Peer Reviewed On: 27 AUG 2023

Published On: 01 SEPT 2023

### Abstract

*This present study was undertaken to investigate the effect of through ICT technique on the academic achievement in mathematics for class IXth. The data were obtained through pre and post tests from 140 (70 experimental and 70 control group) ninth class randomly selected students from Government Senior Secondary School, Amritsar district of Punjab (India). Experimental group was taught through ICT and the control group was taught through traditional teaching techniques. The result of the study revealed significant difference in the Academic Achievement gain scores of the experimental and control group. Academic achievement of the group taught through ICT technique were significantly better as compared to the group taught through traditional technique.*

**Keywords:** ict enabled teaching, student academic achievement, student academic motivation, student engagement.



[Scholarly Research Journal's is licensed Based on a work at www.srjis.com](http://www.srjis.com)

### Introduction

The full form of ICT is Information and Communication Technology. Information and communication technology has a significant impact on how well students learn. Since students had limited access to the course's necessary resources, traditional lectures have been the norm for instruction for decades. However, access to knowledge is rarely a hindrance to a student's education in today's ICT-advanced society. Numerous studies have demonstrated that active, student-centered learning tactics outperform conventional lectures that are based on passive learning, in addition to changes in how information is accessed and given. The basic objective of ICT instruction is to give students and teachers meaningful learning opportunities.

### Student Academic Achievement

Academic Achievement is at the core of all instructional growth. It is thought to be a key objective of training. Academic success is the end outcome of the direction provided to the children throughout their education, which is determined by the evaluations, or imprints, that

the kids' assessment results verify. It primarily demonstrates the learning outcomes of an apprenticeship, which calls for a series of planned and organised experiences. Academic achievement is the primary and foremost responsibility of a school or other educational institution established by the public to progress a child's overall academic development and improvement. Academic achievement assumes a very noteworthy job in the fulfillment of the amicable advancement of the kid. The expectation of academic achievement has accepted colossal significance to its commonsense view. In general, academic achievement is considered as a key basis to pass judgment on one's all out possibilities and limits. It frames the principle premise of affirmation and advancement in a class. It is likewise significant for acquiring a degree or finding a new line of work. For an understudy, estimation of scholastic achievement is significant not just for advanced education on one hand and securing important position on the other, yet in addition for bringing individual fulfillment and social acknowledgment. Scholarly achievement or scholastic execution is the result of instruction the degree to which an understudy, educator or establishment has accomplished their instructive goals. Academic achievement holds an important place in the field of education. It is regarded as the most effective catalyst for human development. One of the most important components of a student's entire academic career is it. In actuality, the pupils' academic success is at the centre of all school activities. It serves as a gauge for teachers' efforts, the importance of the curriculum, and the accomplishment of learning goals in addition to measuring the achievement of the pupils. It is seen as a key objective of education and serves as the foundation for the development of the entire educational system. Academic success opens doors for students to obtaining a worthwhile employment, as well as to finding personal fulfilment and social acclaim.

### **Student Academic Motivation**

Motivation is derived from Latin word *Movere* which mean “to move”. Motivation is expressed as an internal state that leads us to action, pushes us in specific directions and makes us continue to practice certain actions (Çöğür, 2010; Ormrod, 2016). Students who have been motivated to learn, that is all the needs and expectations are met, show the following behaviours: participate in class, repeat knowledge, relate to their existing knowledge and ask questions. In short, these students are eager to learn. The way a student responds to learning determines his level of achievement. For those who are not engaged in action, it is impossible to discuss success (Schunk, 2009). The primary source of motivation is the drive to meet the requirements of the individual. The process of motivation is also influenced by a variety of ideas, including interest, values, attitude, and desire of the individual towards an activity (Akpur 2015). As a result, motivation has a complex structure rather than a straightforward one. Each person may be motivated to a different degree in this regard. Deci and Ryan (2002) looked at three types of motivation that impact performance:

**Intrinsic motivation****Extrinsic motivation**

- **Amotivation**

**Student engagement**

Student engagement is a term which has been used to describe learners' ability to take an interest in everyday school actions, e.g. appeared in classroom, fulfilling necessary work, and follows their teachers' instructions in class (Chapman 2003). A person's improvement and interest in education, which affects their academic performance and activities, is referred to as students' engagement (Gallup, 2013). The emotional, behavioural, and cognitive components all have a role in how engaged students are in their studies.

**Cognitive engagement****Behavioral engagement****Emotional engagement****Literature review**

Singh (2017) investigated the effect of co-curricular activities on 100 secondary school students. "Pearson Product Moment Correlation was used to analyze the data. The findings of the study revealed a significant and positive relationship of academic achievement and co-curricular activities. Doley (2018) conducted a study on "academic achievement of students on the basis of gender, location of the school and management type". The researcher took the sample of 210 students. Thus it was exposed in the study that, significant difference existed in academic achievement while considering the locality of the school and management type of school. Also found that students belonging to urban and government schools had better academic achievement as compared to rural and private schools. Kumavat (2017) studies the academic achievement motivation plays an important role to achieve educational goals of the students. The objective of the study was to find out the achievement motivation among junior college science faculty student. The sample for the present research selected from the junior college in Ahmednagar district. For the research, 12<sup>th</sup> class 96 students of science faculty were selected. The age range of the students were 17 to 18 years. Random sample method was used to sample collection. The data was analyzed with t-test. Results was showed that girl students had more academic achievement motivation than boy students of science faculty.

Triyanto( 2019) said Variations appear when a block exists in the process of meeting the goal, the power motivator may seem helpless and frustrated while intrinsic motivator predicts a strategy to resolve the issue. Adams et al. (2020) found positive connections between students' confidence and academic attainment. Students could accomplish their preferred grades and implement suitable learning behaviour. Positive connections were found between student engagement with feedback and academic self-efficacy. A negative connection was found between students' confidence and academic attainment. Attainment was not connected to the quality 92 of feedback or perceived quantity. It was also found that interrelationships were significant and gave the model in which academic self-efficacy intervened the connections between academic attainment and students' engagement with feedback. Maamin, Maat and Iksan (2022) conducted a study on 227 schools. This study conducts a survey to

determine the influence of student engagement on mathematical achievement. Stratified random sampling was employed to select secondary school students. questionnaires method has been used to collect the data. These results indicate that students' attention and diligence during mathematics learning can improve their mathematics achievement. Students who pay attention and display diligence in learning obtain high academic achievement, while students who do not pay attention and not diligent-in learning obtain low academic achievement. Diligent students make efforts to solve mathematical problems to succeed. This study reveals a positive relationship between student engagement and mathematical achievement.

## 2. METHODS

The design of the present study, sample tools, procedures and data analysis strategies were explained below:

### 2.1 Design

The current study is experimental in nature and is built upon a 2x2 factorial design. A 2x2 factorial design was used to examine how the ICT technique affected the quality of learning in relation to gender.

### 2.2 Sample of the study:

A random sampling method was used for the current study. Government Senior Secondary School Amritsar served as the source of the sample. One section of class IX students was chosen at random to form the treatment group, and the other section served as the control group. Both the treatment and control groups each included a minimum of 35-35 students from class IX. Two sections from each class IX of the school were chosen at random to make groups I and II. There were 140 students total ; 70 students in each of groups I and II.

### 2.3 Tools used :

For the present study, the following tools are used:

1. Student Engagement Scale by Kamat, Vasudha and Fallerio, Sameena(2013)
2. Student Academic Motivation by TR Sharma(2006)
3. ICT based lesson plan (by investigator)

### 2.4 Pre and post tests

A pre test was administered to the students before the invention was introduced. The aim of the pre test was to determine the students prior knowledge and evaluation skills based on what the teacher had previously taught. After the intervention ceased, a post test was given to the students to determine whether the intervention had helped them improve or not.

### 2.5 Hypotheses

- There exists no significant difference between group and gender on the gain scores of academic achievement.
- There exists no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of academic achievement.
- There exists no significant difference between group and gender on the gain scores of academic student motivation.
- There exists no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of academic student motivation.

- There exists no significant difference between group and gender on the gain scores of various dimensions of student engagement of PSEB Senior Secondary School Students of 9<sup>th</sup> class.

2.6 There exists no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of student engagement.

2.7 *Data Analysis*

2.8 Statistical approaches were employed to reduce the data and make it more understandable. Quantitative data from the pre- and post-tests were analysed to establish their general characteristics using descriptive statistics like Mean, Median, and Standard Deviation, as well as the main and interaction effects using a two-way (2x2) analysis of variance. The data were then examined in light of the objectives and hypotheses. If there was a significant difference between the groups in terms of the variability in their scores, it was determined using the two-way ANOVA.

2.9 *3.Results*

The results of the study are elaborated in the succeeding paragraphs along with tables.

**TABLE 1. SIGNIFICANT DIFFERENCE BETWEEN GROUP AND GENDER ON THE GAIN SCORES OF ACADEMIC ACHIEVEMENT.**

Group	Gender	N	Standard Error Difference	Mean	t-value
Experimental group	Boys	35	.930	27.83	.922
	Girls	35			
Control group	Boys	35	.930	26.97	
	Girls	35			

The table 1 reveals that there is significant difference in achievement gain scores of PSEB government senior secondary school students with respect to group and gender. As shown in the above table the mean of secondary school male is 27.83 and the mean of the female is 26.97. It further indicated that the obtained t value of achievement gain scores of PSEB government senior secondary school students with respect to group and gender is more than at 0.05 level of significance. So our null hypothesis “There is no significant difference in achievement gain scores of PSEB senior secondary school students with respect to group and gender “ is not rejected.

*Table 2. ANOVA ON THE ACHIEVEMENT GAIN SCORES WITH RESPECT TO GROUP AND GENDER OF PSEB GOVERNMENT SENIOR SECONDARY SCHOOL STUDENTS*

	Ss	Df	Mss	f-ratio	sig.
<b>Main effects</b>					
Group(A)	25.714	1	25.714	.898	.345
Gender(B)	117.029	1	117.029	4.085	.045*
<b>TWO ORDER INTERACTION</b>					
GROUP*GENDER (A*B)	165.029	1	165.029	5.761	.018*
1ERROR	3895.829	136	28.646		

*\*significant at 0.05 level*

**GROUP (EXPERIMENTAL AND CONTROL GROUP(A))**

It is seen from the table that the f-ratio for the difference between the achievement gain scores of group and gender was .898 and which in comparison to the table value was found to be insignificant at 0.05 level of significance. Hence the null hypothesis, “There is no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of academic achievement has been accepted”.

**GENDER(B)**

It is seen from the table that f-ratio for the difference between the group and gender was 4.085 which in comparison to the table value was found to be significant at 0.05 level of significance . This suggest that the effect of academic achievement motivation of two groups was insignificant. Hence the null hypothesis, “There is no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of academic achievement is rejected”.

**INTERACTION BETWEEN GROUP AND GENDER(A\*B)**

It may be seen from the table that f-ratio for interaction between group and gender was 5.761 which is comparison to the table was found to be insignificant at 0.05 level of significance. This suggested that interaction effect on academic achievement motivation. The result indicated that there was insignificant difference in the mean scores on academic achievement motivation due to interaction effect of on the gain scores of group and gender. Hence the null hypothesis, “There is no interaction between group and gender of PSEB Government Senior Secondary School Students on the gain scores of academic achievement is rejected”.

**TABLE 3. SIGNIFICANCE OF DIFFERENCE BETWEEN GROUP AND GENDER ON THE GAIN SCORES OF ACADEMIC STUDENT MOTIVATION.**

Group	Gender	N	Standard Error Difference	Mean	t-value
Experimental group	Boys	35	.930	28.83	.922
	Girls	35			
Control group	Boys	35	.930	27.97	
	Girls	35			

The table 3 reveals that there is significant difference in student academic motivation gain scores of PSEB government senior secondary school students with respect to group and gender. As shown in the table 3 the mean of secondary school male is 28.83 and the mean of the female is 27.97. It further indicated that the obtained t value of achievement gain scores of PSEB government senior secondary school students with respect to group and gender is more than the table value 0.05 level of significance. Hence the null hypothesis, “There exists no significant difference between group and gender on the gain scores of academic student motivation is not rejected”

**TABLE 4: ANOVA ON THE STUDENT ACADEMIC MOTIVATION GAIN SCORES WITH RESPECT TO GROUP AND GENDER OF PSEB GOVERNMENT SENIOR SECONDARY SCHOOL STUDENTS**

	Ss	Df	Mss	f-ratio	sig.
<b>Main 5effects</b>					
Group(A)	25.713	1	25.713	.897	.345
Gender(B)	117.028	1	117.028	4.085	<b>.045*</b>
<b>TWO ORDER INTERACTION</b>					
GROUP*GENDER (A*B)	165.029	1	165.029	5.761	<b>.018*</b>
ERROR	3895.829	136	28.646		

\*significant level at 0.05 level

**GROUP (EXPERIMENTAL AND CONTROL GROUP (A))**

It is seen from the table that the f-ratio for the difference between the achievement gain scores of group and gender was .897 which in comparison to the table value was found to be insignificant at 0.05 level of significance. Hence the null hypothesis, “There exists no

significant difference between group and gender on the gain scores of academic student motivation has been accepted”

**GENDER (B)**

It is seen from the table that f-ratio for the difference between the group and gender was 4.085 which in comparison to the table value was found to be significant at 0.05 level of significance . Hence the null hypothesis “There exists no significant difference between group and gender on the gain scores of academic student motivation is rejected”

**INTERACTION BETWEEN GROUP AND GENDER(A\*B)**

It may be seen from the table that f-ratio for interaction between group and gender was 5.761 which is comparison to the table was found to be insignificant at 0.05 level of significance. This suggested that interaction effect on academic achievement motivation. The result indicated that there was insignificant difference in the mean scores on academic achievement motivation due to interaction effect of on the gain scores of group and gender. Hence the null hypothesis“There exists no significant difference between group and gender on the gain scores of academic student motivation is not rejected”

*TABLE 5.SIGNIFICANT DIFFERENCE BETWEEN GROUP AND GENDER ON THE GAIN SCORES OF VARIOUS DIMENSIONS OF STUDENT ENGAGEMENT OF PSEB SENIOR SECONDARY SCHOOL STUDENTS OF 9<sup>TH</sup> CLASS.*

	<b>GENDER</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
COGNITIVE	MALE	70	14.54	2.580	.308
	FEMALE	70	13.66	3.198	.382
AFFECTIVE	MALE	70	14.43	2.679	.320
	FEMALE	70	14.33	3.020	.361
BEHAVIOURAL	MALE	70	13.80	2.307	.276
	FEMALE	70	13.83	2.777	.332
TOTAL ENGAGEMENT	MALE	70	42.77	5.570	.666
	FEMALE	70	41.81	6.039	.722



In order to analyze the the analysis of variance, 2x2 ANOVA has been calculated and are presented in the table 6 below-

source of variation	Cognitive					Affective					Behavioural				
	Ss	Df	mss	f-ratio	sig.	Ss	df	mss	f-ratio	sig.	Ss	Df	ms	f-ratio	sig.
Main effects	60.45	1	60.	7.6	.00	3.150	1	3.1	.39	.53	.11	1	.11	.01	.8
Group(A)	7	1	457	45	.06	3.150	1	50	0	3	4	1	4	7	95
Gender(B)	27.45	1	27.	3.7	.06	.350	1	.35	.04	.83	.02	1	.02	.00	.9
	7	1	457	42	5	.350	1	0	3	5	9	1	9	4	47
TWO ORDER INTERACTION GROUP*GENDER (A*B)	29.25	1	29.	3.7	.05	23.20	1	23.	2.8	.09	9.2	1	9.2	1.4	.2
	7	1	257	00	7*	7	1	207	74	2	57	1	57	15	36
ERROR	1075.	1	7.9			1098.	1	8.0			889	1	6.5		
	429	3	08			229	3	75			.71	3	42		
		6					6					6			

\*significance at the level of 0.01 level of confidence

### GROUP

For the Cognitive variable, the main effect of Group (A) was found to be statistically significant (F-ratio = 7.645, p = 0.006). This indicates that there are significant differences in cognitive responses between the groups categorized by Group (A).

However, for the Affective and Behavioural variables, the main effect of Group (A) was not statistically significant (Affective: F-ratio = 0.390, p = 0.533; Behavioural: F-ratio = 0.017, p = 0.895). This suggests that Group (A) does not have a significant impact on affective and behavioural responses.

### GROUP B

The main effect of Gender (B) was not statistically significant for any of the three dependent variables (Cognitive: F-ratio = 3.742, p = 0.065; Affective: F-ratio = 0.043, p = 0.835; Behavioural: F-ratio = 0.004, p = 0.947). These results imply that Gender (B) does not significantly influence any of the observed responses.

### INTERACTION BETWEEN GROUP AND GENDER (A\*B)

The interaction effect between Group (A) and Gender (B) exhibited mixed results. For the Cognitive variable, the interaction effect was borderline significant (F-ratio = 3.700,  $p = 0.057^*$ ). While it did not reach conventional levels of significance, it suggests that there may be some interaction between Group and Gender affecting cognitive responses. However, for the Affective and Behavioural variables, the interaction effects were not statistically significant (Affective: F-ratio = 2.874,  $p = 0.092$ ; Behavioural: F-ratio = 1.415,  $p = 0.236$ ). This implies that the interaction between Group and Gender does not significantly impact affective and behavioural responses.

#### 4. Educational Implications

Any investigation into education is worthwhile if its conclusions can be put to use. Regarding the current investigation, it can be argued that the insightful information acquired may help the pupils attain greater academic success. ICT learning methodologies are applied in the classroom to improve student maths achievement. Consequently, adopting the ICT learning style is a useful teaching strategy. Curriculum designers ought to support teachers who use this method in teaching mathematics. Universities and teacher training programmes should stress ICT learning models as a viable approach to teaching mathematics.

#### REFERENCES

- Abadi, M.M.M, 2013, 'The Relationship between Spiritual WellBeing and Academic Achievement', *European Online Journal of Natural and Social Sciences*, vol. 2, no. 3, pp. 3440-3445.
- Abdullah, MC, Teoh, HC, Roslan, S & Uli, J 2015, 'Student Engagement Concepts, Development and Application in Malaysian Universities', *Journal of Educational and Social Research*, vol. 5, no. 2, pp. 275.
- Abeysekera, L., & Dawson, P. (2015). *Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. Higher Education Research & Development*, 34(1), 1-14.
- Abeysekera, L., & Dawson, P. (2015). *Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. Higher Education Research & Development*, 34(1), 1-14.
- Abeysekera, L., & Dawson, P. (2015). *Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. Higher Education Research & Development*, 34(1), 1-14.
- Abeysekera, L., & Dawson, P. (2015). *Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. Higher Education Research & Development*, 34(1), 1-14.
- Ahmed, K., & Nasser, O. (2015). *Incorporating iPad Technology: Creating More Effective Language Classrooms. TESOL Journal*,6(4), 751-765. doi:10.1002/tesj.192.
- AUSSE. (2013). *Australasian Survey of Student Engagement. Australia: ACER.*
- Bolkan, J. (2012, September 13). *Report: Schools not meeting students' technology needs. The Journal. Retrieved from <http://thejournal.com>*
- Bray A & Tangney B 2016, 'Enhancing student engagement through the affordances of mobile technology', *a 21st century learning perspective on Realistic Mathematics Education, Mathematics. Education Research Journal*, vol. 28, no. 1, pp. 173-197

- Courtner, A 2014, 'Impact of student engagement on academic performance and quality of relationships of traditional and nontraditional students', *International Journal of Education*, vol. 6, no. 2, pp. 24.
- Eyyam, R., & Yaratan, H. S. (2014). Impact of use of technology in mathematics lessons on student achievement and attitudes. *Social Behavior & Personality: An International Journal*, 4231-42. doi:10.2224/sbp.2014.42.0.S31
- Ganta, V. C. 2014, 'Motivation in the workplace to improve the employee performance', *International Journal of Engineering Technology, Management and Applied Sciences*, vol.2,no.6,pp.221-230.
- Herold., B. (2016, February 5). *Technology in education: An overview*. *Education Week*. Retrieved from <http://www.edweek.org>.
- Lee, J.S. 2014, 'The relationship between student engagement and academic performance Is it a myth or reality? *The Journal of Educational Research*, vol. 107(3), pp. 177–185.
- Nguyen T D, Cannata M & Miller J 2016. *Understanding student behavioural engagement Importance of student interaction with peers and teachers*, *The Journal of Educational Research*, Taylor and Francis Routledge.
- Sharma, D & Sharma, S, 2018. *Relationship between motivation and academic achievement*', *International Journal of Advances in Scientific Research*, vol. 4(1), pp. 1-5.
- Varol, F. (2013). *Elementary School Teachers and Teaching with Technology*. *Turkish Online Journal of Educational Technology- TOJET*, 12(3), 85-90.
- Wara, A, Aloka, P.J, Odongo, B.C. 2018. *Relationship between Emotional Engagement and Academic Achievement among Kenyan Secondary School Students*. *Academic Journal of Interdisciplinary Studies*, 7(1), pp. 107-118.

**Cite Your Article as:**

Amit Kauts Ph.d , Namrata Sharma. (2023). EFFECT OF ICT ON STUDENT ACADEMIC ACHIEVEMENT, ACADEMIC MOTIVATION AND STUDENT ENGAGEMENT AMONG 9TH CLASS STUDENTS. *Scholarly Research Journal for Interdisciplinary Studies*, 12(78), 530–540. <https://doi.org/10.5281/zenodo.8310767>