

**EFFECT OF BLENDED LEARNING STRATEGY ON ACHIEVEMENT IN
COMPUTER SCIENCE IN RELATION TO COMPUTER SELF**

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Abstract

The present study investigates the effect of blended learning strategy on achievement in computer science in relation to computer self efficacy. The sample consisted of 120 students of class XI selected from two different schools of Amritsar in Punjab affiliated to CBSE, New Delhi. Instructional material based on blended learning strategies was prepared and utilized to teach the experimental group. After pre and post-testing on all the students, gain scores were computed. The computer self efficacy test were also administered. Descriptive statistical techniques such as Mean, Standard Deviation were used in the analysis of data. The F-ratio and t-test were employed to find significance of difference between means related to different groups and variables. The data was analyzed using analysis of variance (2×3) and following conclusions were drawn – (i) The performance of blended learning strategy group was found significantly higher as compared to the traditional group. (ii)The performance of high computer self efficacy was higher than that of average and low computer self efficacy group. (iii)There was significant interaction effect between instructional strategies and computer self efficacy on achievement in computer science.

Keywords: - Blended Learning Strategy, Achievement, Computer Self efficacy

Introduction

Education is the field of study that deals mainly with methods of teaching and learning in schools. It is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits, methods including storytelling, discussion, teaching, training, and directed research. Education has a formative effect on the learning and the way one thinks, feels, or acts in formal and informal settings (Dewey, 1944). Learning is influenced by multiple components of interrelated beliefs and self directed strategies. Pintrich (1999) described learning as an active, constructive process whereby learners set goals for their learning plan actions and monitor, regulate and control their cognition, motivation and behavior. These actions are guided and constrained both by their goals and contextual framework and can mediate the relationships between learners and the context and their overall achievement (Zimmerman, 2000). In recent years, with the development of ICT, technology proves to be a vital part of effective learning Technology gives learners the chance to experience the real world gradually and smoothly (Jackson, 2014). Due to which computer and internet have become widely used in the education, and the trend of education became globalized and

sharing. Using computers as an educational method started since 1977 due to the development of the computers and digital multimedia (Vaughan, 2007).

The traditional method 'using books' has limited effect on students learning, on the other hand using computer as an educational method provide an interactive environment and effective learning. According that, the education has implemented educational opportunities for learners to be taught face-to-face in the class setting along with additional course instruction via the internet, using on-line instructional tools such as Web Logs, discussion boards, and chat rooms. This learning format is known as blended learning strategy and it is also known as hybrid learning (Buzzetto-More & Guy, 2006; Lindsay 2004).

Blended learning strategy represents an educational method that converts the curriculum into a computerized topics and multimedia such as image and sounds to make the educational process more effective and valuable. Blended learning can broaden the spaces and opportunities available for learning, support course management activities, support the provision of information and resources to students, engage and motivate students through interactivity and collaboration. Theoretically, Graham (2006) defines blended learning strategy is "a combination of instruction from two historically separate models of teaching and learning: traditional face to face learning systems and computer mediated learning". Welker and Berardino (2005) also defined as the integration of e-learning tools such as virtual learning environment with face to face learning. MacDonald (2008) defines blended learning as a mixture of synchronous technology (video, audio) and asynchronous media (like emails, blogs) of information and communication delivery.

Smart and Cappel (2006) blended learning is advantageous because learning is not limited to a one-time event in the classroom. For example blended instruction is an extension of the classroom discussions that encourages further dialogue over Internet protocol to support revised meaning schemes because the course can be designed with discussion boards, chat sessions, e-mail, and web logs. Bailey and Martin (2013) blended learning allows learners to visualize, understand, listen, feel, and interact with the learning material. Blended learning moves the learner from theory into practice. They can learn according to their pace and interest, which creates the opportunity for more depth knowledge and individualized education. Good achiever can expand their learning and the slow achievers can repeat and revise notes and get feedback from their teachers to overcome problems and challenges they face blended education increased in popularity to : (i) combat the expense of higher education (ii) increase convenience to consumers of education; and (iii) to increase student engagement (Kamenetz, 2010; Lim & Morris, 2009).

Watson, (2008) blended learning must be defined both accurately and comprehensively for this thesis. Blended learning is defined in this thesis as instruction that delivers between 30 percent and 79

percent of its content online. The remaining content is provided through face to face instruction or other non web based methods, such as paper textbooks.

The word Achievement implies the act of attaining a desired end or aim which require certain amount of efforts. It is the proficiency in a given skill. Educationally achievement refers to an individual's performance up to desired level in a particular field. It is level of a person's learning and his ability to apply what he has learnt in a given field of learning. It is the extent to which a learner is profiting from instruction in a given area of learning. It is the outcome of general and specific learning experiences. Algarabel and Dasi (2001) define achievement as the competence of a person in relation to a domain of knowledge through observing his performance. According to Crow and Crow (1969) achievement is the extent to which a learner is profiting from instruction in a given area of learning. It is the outcome of general and specific learning experiences. Good (1959) refers to achievement as the knowledge attained or skill developed in the subject usually designated by test scores or marks assigned by the teacher.

According to Bandura (1994), "Self efficacy is concerned with perceived capability and should be phrased in terms of can do rather than will do. Can is a judgment of capability; will is a statement of intention". He further explained that perceived self efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self efficacy beliefs determine how people feel, think, motivate themselves and behave. Keller (1987 a) states that "Self-efficacy considers the amount of effort a person is willing to exert in pursuit of a goal; hence, self -efficacy has magnitude and direction".

According to Moore (2004) "students want convenience, flexibility, relevance, immediate applicability, and usefulness for employability, competence, choice, and rapid feedback". They can use technology which provides all these things that enables them to be engaged actively in the process of education. Wang and Newlin (2002 a & b) found that both self-efficacy for learning course content, as well as self-efficacy for technology skills, were predictive of learner performance.

Miura (1987) has suggested that self-efficacy may be an important factor related to the acquisition of computing skills. Computer self-efficacy is a specific type of self-efficacy. Computer self-efficacy means one's perception of their computer skills about computer use. Computer self-efficacy is related more to computer management ability for a particular task than to partial computer skills in information technology

(Compeau & Higgins, 1995). Marakas, Yi and Johnson (1998) states that CSE is individual's perception of efficacy in performing specific computer-related tasks within the domain of general computing. Thatcher and Pamela (2002) theorized that CSE exists at both the general computing behavior level and the specific computer task or application level. General CSE refers to an individual's judgment of his or her ability to perform across multiple computer application domains; specific CSE refers to an individual's perception of efficacy in performing specific computer - related tasks within the domain of general computing. Computer self-efficacy has been shown to be positively related to performance during computer training (Webster & Martocchio, 1992).

Need and Significance

In India most of the students consider the education boring and ineffective because of the lack of the creativity in the ways of teaching. The methods which are used only focused on the theoretical parts and practicality is fully ignored which is actually the demand of the society. In order to make the teacher and students more advanced, competent, active, knowledgeable, one cannot depend only upon the traditional methods of teaching and learning. Thus there is need to introduce the new technological methods in order to promote self directed learning opportunities for students. In the 21st century new forms of technology are rapidly generating new literacy required to effectively develop students' creative as well as novel potentials and also foster efficacy towards computer science. This can be done with the help of blended learning strategies which mix both online and traditional ways of instruction delivery which include online course content, with frequent online discussions and interactions. In the present study the effectiveness of blended learning strategies is studied on achievement in computer science in relation to computer self efficacy as the investigator felt that there is a need that blended learning strategies should be incorporated in schools because it has the potential to develop the various skills and abilities among students and make them better informed and high achievers and computer self efficacy motivate the learner to deal with new inventions of the technology in the field of education.

Objectives

1. To compare the achievement of groups of students taught through blended learning strategy and traditional teaching strategy in computer science.
2. To compare the achievement of students on computer self efficacy in computer science.
3. To examine the interaction effect of blended learning strategy and computer self efficacy on achievement in computer science.

Hypotheses

H₁: The achievement of group taught through blended learning strategy will be significantly higher than that of traditional teaching strategy in computer science.

H₂: The achievement of high computer self efficacy group will be significantly higher than that of average and low computer self efficacy group.

H₃: There will be significant interaction effect of blended learning strategy and computer self efficacy on achievement in computer science.

Sample

The present study was conducted on random sample of 120 computer science students of XI class of two English medium private schools with facility to teach through computer and broadband connection of Amritsar (Punjab) affiliated to Central Board of Secondary Education, New Delhi. The two schools were randomly selected from a list of schools of Amritsar with appropriate broadband facility. The sample included 60 students from the Ajanta Public School, Amritsar and 60 students from the DAV Public School, Amritsar. Further from each school the two intact sections of 30 students were selected randomly to serve as experimental and control group.

Design

For the purpose of present investigation a pre and post-test factorial design was employed. In order to analyze the data, mean, standard deviation, analysis of variance (2×3) and t-ratio were used for the two independent variables which are blended learning strategy and computer self efficacy. The impact of blended learning strategy was examined at two levels, namely blended learning strategy and traditional teaching strategy. The classification of computer self efficacy group was done at three levels such as high, average and low computer self efficacy. The main dependent variable was the achievement in computer science, which was calculated as the difference in post and pre-test scores for computer science subject.

Tools Used

- 1 General Mental Ability Test (1972) by Jalota was used to access the intelligence of the students for matching the group.
- 2 Computer Self Efficacy Scale was developed by the investigators.
- 3 An Achievement Test in Computer Science developed by the investigators.

4 Instructional Material for Blended Learning and Traditional Teaching Strategy on five topics such as introduction to database concepts, data types and keys, classification of SQL commands and creating and using MySQL of IX class computer science subject were developed by investigators.

Procedure

After the selection of the sample and allocation of students to the two instructional strategies, the experiment was conducted in five phases. Firstly, students were randomly assigned to control and experimental group. Secondly, the test of computer self efficacy was administered in each school in order to identify the computer self efficacy levels of the students. Thirdly, an achievement test in computer science as pre-test was administered to the students of experimental and control groups. The answer-sheets were scored to obtain information regarding the previous knowledge of the students. Fourthly, the experimental group was taught through blended learning strategy and control group was taught through traditional teaching strategy by the investigators. Fifthly, after the completion of the course, the same achievement test in computer science as post-test was administered to the students of both the groups. The answer-sheets were scored with the help of scoring key.

Analysis and Interpretation of the Results

- **Analysis of Descriptive Statistics**

The data were analyzed to determine the nature of the distribution of scores by employing mean and standard deviation. The Analysis of Variance (2×3) was used to test the hypotheses related to blended learning strategy, traditional teaching strategy and computer self efficacy levels. The mean and standard deviation of different sub groups have been presented in table- 1, 2, 3, 4 &5.

Table-1: Means and SD of Gain Achievement Scores for the Different Computer Self Efficacy Groups

Computer Self Efficacy Groups	Teaching						Total		
	Blended Learning Strategy			Traditional Teaching Strategy					
	N	Mean	SD	N	Mean	SD	N	Mean	SD
High Computer Self Efficacy	16	12	2.40	16	7.75	1.86	32	9.94	2.81
Average Computer Self	28	8.64	1.32	28	6.61	1.53	56	7.63	1.75
Low Computer Self Efficacy	16	6.65	1.77	16	4.5		32	5.55	1.85
Total	60	9	2.59	60	6.35		N= 120		

Source: Field Study, 2017

Table-1 observes that the mean gain scores of Blended learning strategy (M=9.0) is higher than the traditional teaching strategy (M=6.35). This shows that blended learning strategy is more effective than the traditional teaching strategy. It is also confirmed that the mean of the three groups' i.e. high, average and low computer self efficacy group is 9.94, 7.63 and 5.55 respectively. It is concluded that the mean gain scores with blended learning strategy has shown significant differences for high, average and low computer self efficacy students. These differences are also found with respect of the different computer self efficacy group taught through traditional teaching strategy.

- **Analysis of Variance on Gain Achievement Scores**

The mean of different sub-groups, sum of squares, degree of freedom, mean sum of squares and the F - ratio have been presented in table-2

Table-2: Summary of Analysis of Variance (2×3) factorial design

Source of Variance	Sum of Squares	df	Mean Sum of Squares	F- ratio
Blended Learning Strategy (A)	210.67	1	210.67	82.62**
Computer Self Efficacy (B)	315.33	2	157.67	61.83**
Interaction (A×B)	32.46	2	16.23	6.36 **
Error Term	290.86	114	2.55	

***Significant at 0.01 level*

(Critical Value 3.93 at 0.05 and 6.86 at 0.01 levels, df 1/114)

(Critical Value 3.08 at 0.05 and 4.80 at 0.01 levels, df 2/114)

Blended Learning Strategy (A)

Table -2 reveals that that the F-ratio for difference in mean gain scores of blended learning strategy and traditional teaching strategy group is 82.62, which in comparison to the table value was found significant at 0.01 level of significance. It shows that the groups were not different beyond the contribution of chance. Hence, the hypothesis H₁: The performance of blended learning strategy group will higher than that of traditional teaching strategy group in computer science is accepted. The result indicates that the performance of blended learning strategy group was more effective than that of the traditional teaching strategy group in computer science.

To probe deeper F-ratio was followed by t-test. The value of t-ratio for experimental and control group have been placed in table-3.

Table – 3: t-ratio of gain mean scores between experimental and control groups

Variables	Experimental Group			Control Group			SE _D	t-Value
	N	Mean	SD	N	Mean	SD		
Gain Achievement Scores	60	9	2.59	60	6.35	1.99	0.42	6.31**

** Significant at 0.01 level

(Critical Value 1.98 at 0.05 and 2.62 at 0.01 levels, df 118)

Table-3 states that mean gain score of experimental group is 9.0, which is higher than the corresponding mean gain score of 6.35 of the control group. The t-value testing the significance of mean differences of blended learning strategy and traditional teaching is 6.31, which in comparison to the table value was found significant at 0.01 level of significance. The result indicates that the performance of blended learning strategy group was more effective than that of the traditional teaching strategy.

Computer Self Efficacy (B)

Table-2 shows that the F-ratio for difference in mean gain scores of the three groups of computer self efficacy are 61.83, which in comparison to the table value was found highly significant at 0.01 level of significance. It suggests that the three groups were different with respect of achievement scores. Hence, the hypothesis H₂ : The performance of high computer self efficacy group will be higher than that of average and low computer self efficacy group in computer science, is accepted. The result indicates that the performance of students in computer science taught through blended learning strategy has significant differences for high, average and low computer self efficacy groups.

To probe deeper F-ratio was followed by t-test. The value of t-ratio for experimental and control group have been placed in table-4.

Table-4: t-ratio for different combinations of difference computer self efficacy groups

Computer Self Efficacy Level	High Computer Self Efficacy			Average Computer Self Efficacy			Low Computer Self Efficacy		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
	32	9.94	2.81	56	7.63	1.75	32	5.55	1.85

High Computer Self Efficacy					
N	Mean	SD	--	4.2**	7.4**
32	9.94	2.81			
Average Computer Self Efficacy					
N	Mean	SD	--	--	5.33**
56	7.63	1.75			
Low Computer Self Efficacy					
N	Mean	SD	--	--	--
32	5.55	1.85			

**Significant at 0.05 level*

***Significant at 0.01 level*

(Critical Value 1.99 at 0.05 and 2.63 at 0.01 levels, df 86)

(Critical Value 2.00 at 0.05 and 2.66 at 0.01 levels, df 62)

Table-4 shows that high computer self efficacy group with mean of 9.94 exhibits higher mean gain score than average computer self efficacy group with mean of 7.63. The t-ratio for the difference in gain mean scores of high and average computer self efficacy groups is 4.2, which in comparison to the table value was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high and average computer self efficacy irrespective of grouping across other variable. The result indicates that high and average computer self efficacy group was significantly different with respect of gain scores.

Table-4 observes that high computer self efficacy group with mean of 9.94 shows higher mean gain score than low computer self efficacy group with mean of 5.55. The t-ratio for the difference in gain mean scores of high and low computer self efficacy groups is 7.4, which in comparison to the table value was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high and low computer self efficacy irrespective of grouping across other variable. This infers that high computer self efficacy group performs significantly better than that of low computer self efficacy group on achievement in computer science with respect of gain scores.

Table-4 reveals that average computer self efficacy group with mean of 7.63 exhibits higher mean gain score than low computer self efficacy group with mean of 5.55. The t-ratio for the difference in gain mean scores of average and low computer self efficacy groups is 5.33, which in comparison to the table value was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of average and low computer self efficacy irrespective of grouping across other variable. This infers that average computer self efficacy group performs significantly better than that of low computer self efficacy group on achievement in computer science with respect of gain scores.

Interaction Effect (A×B)

Table-2 reveals that the F- ratio for the interaction between treatment and computer self efficacy groups is 6.63, which in comparison to the table value was found significant at 0.01 level of significance. It indicates that the two variables interact with each other. Thus, the hypothesis H₃, there will be significant interaction effect between instructional strategy and computer self efficacy on achievement in computer science, is accepted at 0.01 level. The results indicate that there was significant difference in gain scores on achievement in computer science due to interaction effect of blended learning strategy and computer self efficacy groups. The blended learning strategy and traditional teaching strategy did not yield equal levels of gain achievement for high, average and low computer self efficacy for the students.

To ascertain significance of difference of means of different combination groups, t-ratio were computed which have been placed in table-5

Table-5: t-ratio for difference in mean gain achievement scores of instructional strategies and different computer self efficacy groups

	Variables	Experimental Group						Control Group											
		High Computer Self Efficacy			Average Computer Self Efficacy			Low Computer Self Efficacy			High Computer Self Efficacy			Average Computer Self Efficacy			Low Computer Self Efficacy		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
		16	12	2.40	28	8.64	1.32	16	6.65	1.77	16	7.75	1.86	28	6.61	1.53	16	4.5	1.32
Experimental Group	High Computer Self Efficacy	---			5.17**			3.52**			5.59**			8.05**			11.03**		
	N Mean SD	---																	
	16 12 2.40																		
Experimental Group	Average Computer Self Efficacy	—			—			1.40			1.68			5.34**			9.86**		
	N Mean SD	—			—														
	28 8.64 1.32																		
Experimental Group	Low Computer Self Efficacy	---			---			—			0.72			0.03			1.49		
	N Mean SD	---			---			—											
	16 6.65 1.77																		
Control Group	High Computer Self Efficacy	---			---			—			---			2.07*			5.60**		
	N Mean SD	---			---			—			---								
	16 7.75 1.86																		

Average Computer Self Efficacy							4.80**
N Mean SD	—	—	—	—	—		
28 6.61 1.53							
Low Computer Self Efficacy							—
N Mean SD	---	---	—	---	---		
16 4.5 1.32							

Table-5 reveals that high computer self efficacy of experimental group with mean of 12 exhibits higher mean gain score than average computer self efficacy of experimental group with mean of 8.64. The t-ratio for the difference in mean gain scores of high and low self efficacy of experimental groups is 5.17, which in comparison to the table value ($t_{0.01}=2.71$, df 42) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high and low computer self efficacy of experimental group irrespective of grouping across other variable.

Table-5 reveals that high computer self efficacy of experimental group with mean of 12 exhibits higher mean gain scores than low computer self efficacy of experimental group with mean of 6.65. The t-ratio for the difference in mean gain scores of high and low computer self efficacy of experimental groups is 3.52, which in comparison to the table value ($t_{0.01}=2.75$, df 30) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high and low computer self efficacy of experimental group irrespective of grouping across other variable.

Table-5 shows that high computer self efficacy of experimental group with mean of 12 exhibits higher mean gain score than high computer self efficacy of control group with mean of 7.75. The t-ratio for the difference in mean gain scores of high computer self efficacy of experimental group and high computer self efficacy of control group is 5.59, which in comparison to the table value ($t_{0.01}=2.75$, df 30) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high computer self efficacy of experimental group and high computer self efficacy of control group irrespective of grouping across other variable.

Table-5 observes that high computer self efficacy of experimental group with mean of 12 shows higher mean gain score than average computer self efficacy of control group with mean of 6.61. The t-ratio for the difference in mean gain scores of high computer self efficacy of experimental group and average computer self efficacy of control group is 8.05, which in comparison to the table value ($t_{0.01}=2.71$, df 42) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high computer self efficacy of experimental group and average computer self efficacy of control group irrespective of grouping across other variable.

Table-5 finds that high computer self efficacy of experimental group with mean of 12 exhibits higher

mean gain score than low computer self efficacy of control group with mean of 4.5. The t-ratio for the difference in mean gain scores of high computer self efficacy of experimental group and low computer self efficacy of control group is 11.03, which in comparison to the table value ($t_{0.01}=2.75$, df 30) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high computer self efficacy of experimental group and low computer self efficacy of control group irrespective of grouping across other variable.

Table-5 reveals that average computer self efficacy of experimental group with mean of 8.64 shows higher mean gain score than average computer self efficacy of control group with mean of 6.61. The t-ratio for the difference in mean gain scores of average computer self efficacy of experimental group and average self efficacy of control group is 5.34, which in comparison to the table value ($t_{0.01}=2.67$, df 54) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of average computer self efficacy of experimental group and average computer self efficacy of control group irrespective of grouping across other variable.

Table-5 observes that average computer self efficacy of experimental group with mean of 8.64 exhibits higher mean gain score than low computer self efficacy of control group with mean of 4.5. The t-ratio for the difference in mean gain scores of average computer self efficacy of experimental group and low computer self efficacy of control group is 9.86, which in comparison to the table value ($t_{0.01}=2.71$, df 42) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of average computer self efficacy of experimental group and low computer self efficacy of control group irrespective of grouping across other variable.

Table-5 shows that high computer self efficacy of control group with mean of 7.75 exhibits higher mean gain score than average computer self efficacy of control group with mean of 6.61. The t-ratio for the difference in mean gain scores of high computer self efficacy of experimental group and average self efficacy of control group is 2.07, which in comparison to the table value ($t_{0.01}=2.71$, $t_{0.05}=2.02$, df 42) was found significant at 0.05 level of significance. Hence, the hypothesis of significant differences is accepted in case of high computer self efficacy of experimental group and average computer self efficacy of control group irrespective of grouping across other variable.

Table-5 reveals that high computer self efficacy of control group with mean of 7.75 shows higher mean gain score than low computer self efficacy of control group with mean of 4.5. The t-ratio for the difference in mean gain scores of high and low computer self efficacy of control group is 5.60, which in comparison to the table value ($t_{0.01}=2.75$, df 30) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of high computer self efficacy of control group and low computer self efficacy of control group irrespective of grouping across other variable.

Table-5 observes that average computer self efficacy of control group with mean of 5.71 exhibits higher mean gain score than low computer self efficacy of control group with mean of 4.5. The t-ratio for

the difference in mean gain scores of average and low computer self efficacy of control group is 4.80, which in comparison to the table value ($t_{0.01}=2.71$, df 42) was found significant at 0.01 level of significance. Hence, the hypothesis of significant differences is accepted in case of average computer self efficacy of control group and low computer self efficacy of control group irrespective of grouping across other variable.

Table 5 shows that rest of the combination group's i.e. average with low computer self efficacy of experimental group, average computer self efficacy of experimental group with high computer self efficacy of control group, low computer self efficacy of experimental group with high, average and low computer self efficacy of control group did not yield significance difference on achievement in computer science even at 0.05 level of significance.

Discussion

The results of the present investigation have lead to the conclusion that blended learning strategy group was more effective as compared to the traditional strategy group in computer science. Hence, the hypothesis H_1 was accepted. The results are consistent with the findings of Prensky (2008) who reported that enthusiasm for blended learning strategies have positive effect on student's achievement instead of traditional teaching strategy. Melton, Bland and Chopak-Foss, (2009) found that student achievement and success rates in blended courses were slightly superior to traditional courses. Mendez and Gonzalez (2010) also states that blended learning save time and improve achievement for both teacher and student in comparison to traditional teaching strategies. Bandura, (2011) revealed that students became more creative and self efficacious when they are taught through blended learning strategies in comparison to traditional methods of teaching. Mehar and Kaur (2017) found that the performance of group taught through web based instructional strategies was found significantly higher as compared to the traditional teaching strategies. But in contradiction to it Rovai, (2007) states that many learners view blended learning as both more difficult than face to face learning but of higher quality and Dede, 2007; 2009b; 2011 states that blended learning change the role of teacher from sage on the stage to guide on the side.

The performance of high computer self efficacy group was higher as compare to average and low computer self efficacy group in computer science. Hence, the hypothesis H_2 was accepted. These results are supported by the finding of Papasratorn & Wangpipatwong (2006) which suggested that students with high computer self efficacy are confident and active as compare to the low computer self-efficacy students who may feel uncomfortable. Shea and Bidjerano (2010) revealed that computer self efficacy of students became improved and high as a result of online learning and blended learning which positively affect the their achievement level. Langford and Reeves (2016) states that students show high computer self efficacy due to their internal locus of control and past experiences in comparison to average and low computer self efficacy.

The performance of blended learning was found interacting with each other at different levels of computer self efficacy. Hence, hypothesis H₃ was accepted. The results are supported by Pintrich and De Groot, (1990) revealed that computer self efficacy and blended learning strategies are positively and closely related to each other and when students use these strategies it will enhance their achievement positively. Yuen (2011), states that blended learning increase students engagement in learning process which further increase their computer self efficacy level.

Findings

1. The performance of students taught through blended learning group was found more effective than that taught through traditional teaching strategy group in computer science.
2. The mean gain scores of high computer self efficacy group were higher than that of average and low computer self efficacy groups in computer science.
 - The mean gain achievement scores were found significantly higher for high and average computer self efficacy group.
 - The mean gain achievement scores were found significantly higher for high and low computer self efficacy group.
 - The mean gain achievement scores were found significantly higher for average and low computer self efficacy group.
3. There was significant interaction effect between instructional strategy and computer self efficacy group.
 - The high computer self efficacy of experimental group possesses higher mean gain achievement scores than that of average and low computer self efficacy of experimental group.
 - The high computer self efficacy of experimental group possesses higher mean gain achievement scores than that of high, average and low computer self efficacy of control group.
 - The average computer self efficacy of experimental group possesses higher mean gain achievement scores than that of average and low computer self efficacy of control group.
 - The high computer self efficacy of control group possesses higher mean gain achievement scores than that of average and low computer self efficacy of control group.
 - The average computer self efficacy of control group possesses higher mean gain achievement scores than that of low computer self efficacy of control group.
 - The rest of the combinations of instructional strategies and computer self efficacy groups did not yield significant difference in mean gain achievement scores in computer science.

Educational Implications

The present study reveals that blended learning strategy gives better results than traditional teaching strategy for school students. This could be because the students are able to use the blended learning strategies at their own pace. Further, the computer self efficacy inversely affects the achievement of computer science students in technology based as well as traditional teaching environments. The blended learning strategy and computer self efficacy seems to be a good predictor of achievement of students in computer science. The faculty members are advised to adopt applications of blended learning strategy and the use of e-learning tools and educational software in teaching because of its effectiveness in the development of the knowledge and skills of students and their attitudes. Hence appropriate guidance and training to use computer must be given to achieve good results.

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