Effect Of Blended E-Learning On Cognitive Absorption Of Senior Secondary School Students

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Abstract: The present research entails experimental method to investigate the effect of blended e-learning on cognitive absorption of senior secondary school students. The study used pre-test post-test control group design. The study was conducted on sample of 60 students of class XI Commerce stream from two private co-educational CBSE affiliated schools of Nangal City, in Ropar district of Punjab. The selected sample of 60 students was equally divided into the experimental group (30 students) and the control group (30 students). The experimental group was taught through the blended e-learning and the control group was taught through the traditional teaching. The findings revealed that the mean gain score on cognitive absorption of students taught through blended e-learning was found significantly higher than the mean gain score of students taught through the traditional teaching.

Keywords: Blended E-Learning, Cognitive Absorption, Senior Secondary School Students.

INTRODUCTION

The contemporary educational system is transforming with technology advancement and information enhancement. While the developments monitored in science and technology in the 21st century have enlarged the responsibilities of an education system and also brought new opportunities. To meet the challenges of expansion and to cater the individual's needs, the education system is trying to adopt new technologies and exploring new paths so as to reach the goal of quality educational opportunities for all. Recent, Internet-based education technologies have eliminated conventional place and time obstructions and have offered students an access to information whenever and wherever they want. That the learners can access the information without being dependent on time and place has made the Internet an indispensable part of the education. The courses offered using the internet can be regarded as an enriched education. It comprises web-based online courses, blended courses and other kinds of internet complemented courses (Kaya, 2002).

Sahan (2005) asserted that web-based education is an innovative education form that can be used to support the acquisition of new information skills and the enrichment of students learning habits and experiences. Many instructional techniques such as presentations, discussions, demonstration, answer-question, brainstorming, case studies, information hunt, cooperative learning and problem-centered learning can be conducted in a web-based environment. In this manner, it is feasible for the learners to obtain experiences of reading, writing, observing, listening and performing tasks (Simsek, 2002). Many users prefer the e-learning platform as there is easiness in learning new things from experts while being at home. The purpose of this research is to identify and empirically validate a theory explaining social, immersive and engaging online learning behaviour, which is essential in improving the online learning experience. Therefore, the psycho-physiological mechanism that underpins the successful e-learning experiences needs to be considered in an integrated e-learning environment. Hence, we being in the education sector, if want to improve the brand value

of our educational institutions, then investing in e-learning is the best way and that will bring new dimensions to teaching learning process, opens up a wider pool of knowledge for the students and unlocks before them numerous opportunities to learn, unlearn and relearn.

BLENDED E-LEARNING

The word 'blended' indicates a blend within the e-learning mix of media or a blend of e-learning with other advancements. In an educational analysis, we observe a blend of technologies and skills that students exploit in their lives expanded a lot and getting added into their studies. The blend could be among videotape, CD-ROM, Web-based training, films with face-to-face (F2F) instructor-led training (Driscoll, 2002). Singh (2003) portrayed this type of blend as 'blended e-learning'. From a course design perspective, a blended course can be found anywhere between the fully face-to-face and fully online learning environments (Rovai & Jordan, 2004).

Martyn (2003) stated that a successful blended e-learning environment comprises a primary face-to-face (F2F) meeting, weekly online assessments, synchronous chat, asynchronous discussions, e-mail and a concluding face-to-face (F2F) meeting having supervised eventual examination. It is supposed that such an environment offers students more control over their learning (Hooper, 1992; Saunders & Klemming, 2003); develop students morale and overall satisfaction (Byers, 2001), increases information skill acquisition and student achievement (Kendall, 2001), value the differences in learning style and speed (Piskurich, 2004) and encourages communication and contact among students and tutors (Joliffe, Ritter & Stevens, 2001).

COGNITIVE ABSORPTION

Cognitive absorption examines technology adaptation from psychological point of view. It highlights the complete, holistic user experience with information technology (IT) by identifying the non-instrumental variables such as enjoyment, control and curiosity could be aroused in the user via information technology (Agarwal & Karahanna, 2000).The five dimensions of cognitive absorption are generally classified into two types of dimensions i.e. Cognitive Dimensions and Affective. Temporal Dissociation, Focused Immersion Control and Curiosity indicate the Cognitive Dimensions and Heightened Enjoyment specify the Affective Dimensions (Weniger & Leobbecke, 2011). These dimensions have been explicated as follows -

1. Temporal Dissociation is the deeper involved with the software. The dissociation allows an individual to perceive him or herself as having enough time to complete an assignment. The more an individual thinks him/herself having the skill to exploit the technology, the more he/she is supposed to use that technology.

2. Focused Immersion is when an individual is involved in an activity, he/she may have tendency to ignore other concerns and become fully attentive towards the technological interaction. An individual's immersion in using the technology reduces the cognitive burden connected with completing the assignment.

3. Heightened Enjoyment exhibits that when an individual is busy in a technological activity, there is a level of pleasure connected that can be verified. When people experience pleasure in doing an activity, they are ready to be part of that activity frequently.

4. Control indicates an individual's feeling of control of his/her use of technology. Due to control, the users find technology more absorbing. Thus, an individual having more control over his/her usage of technology, the more he/she is likely to use that technology.

5. Curiosity refers to an individual's imagination and excitement that increases while they interact with the technology. Hence, it lessens the seeming cognitive burden related with the usage of technology.

REVIEW OF RELATED LITERATURE

Elmezni and Gharbi (2010) studied the mediating role of cognitive absorption between user's time styles and website satisfaction. The study was conducted on 300 university students (i.e. 200 male; 100 female) having 3 years experience of using commercial websites. The confirmatory factor analysis was carried out to test the convergence of cognitive absorption and website satisfaction. T-test was carried out to check the mean differences between variables and regression analysis was done to check the impact of website satisfaction on website continuance intention. It was inferred that the website satisfaction impacts website usage continuance intention positively.

Cuhadar (2013) investigated university student's cognitive absorption levels regarding web and its relationship with locus of control. The study followed a descriptive model. The study was conducted at Trakya University. The sample of the study was 374 undergraduate students selected through multistage sampling carried out in seven different faculties of Trakya University. For collecting the data, two tools were used i.e. Cognitive Absorption Scale and Locus of Control Scale. The independent samples t-test, one-way ANOVA, regression and correlation analysis was used to analyze the data. The results revealed an average cognitive absorption level of university students.

Kurt and Emiroglu (2018) evaluated student's online information searching strategies, exposure to internet pollution and cognitive absorption levels based on various variables. The survey model was applied in the study. The sample of the study was 198 students studying in Computer Engineering, Computer Education and Instructional Technologies Departments of two universities situated at two cities in the Central Anatolian Region. Online Information Searching Strategy Inventory, Internet Information Pollution Scale and Cognitive Absorption Scale were used to collect data. The collected data was analysed by two-way ANOVA. The male student's average score for online information searching strategies was found higher than the average score of female students.

Butt, Mahmood and Saleem (2022) explored the role of institutional factors and cognitive absorption on student's satisfaction and performance in online learning during COVID19. The study was conducted at top ten public and top ten private sector universities of Punjab, Lahore, Pakistan. The sample of the study was 404 students from bachelor, master, Ph.D and diploma courses in the Universities. A self-administered questionnaire created in Google Form sent to students through mail as well as shared through link on the Universities Facebook page to collect data. The data was analyzed through structural equation modelling using AMOS. The results showed that the institutional factors influence the student's performance in positive way.

OBJECTIVES OF THE STUDY

The present study was conducted to achieve the following objectives:

1. To examine the effect of blended e-learning on cognitive absorption of students.
2. To examine the effect of blended e-learning on dimensions of cognitive absorption (i.e. temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) of students.
3. To examine the effect of blended e-learning on cognitive absorption of students with respect to gender.
4. To examine the effect of blended e-learning on dimension of cognitive absorption (i.e. temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) of students with respect to gender.

HYPOTHESES OF THE STUDY

The present study was designed to test the following hypothesis –

H_{01}: There exists no significant effect of blended e-learning on cognitive absorption of students.

H_{02}: There exists no significant effect of blended e-learning on dimensions of cognitive absorption (i.e. temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) of students.

H_{03}: There exists no significant effect of blended e-learning on cognitive absorption with respect to gender.

H_{04}: There exists no significant effect of blended e-learning on dimensions of cognitive absorption (i.e. temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) with respect to gender.

SAMPLE

The sample of the present study comprised 60 students (i.e. 30 students in each school) of class XI Commerce Stream from the two private co-educational CBSE affiliated schools of Nangal Township, District Ropar (PB). In the whole sample, there were 36 boys and 24 girls students.

TOOLS USED

In the present study, the following tools were used for data collection:

- A class website on Google Sites was developed and validated by the investigator.
- The cognitive absorption scale developed by Agarwal and Karahanna (2000) was adapted.

RESULTS AND DISCUSSION

Using the different statistical techniques, the hypotheses of research study have been tested as follows:

H$_{01}$: THERE EXISTS NO SIGNIFICANT EFFECT OF BLENDED E-LEARNING ON COGNITIVE ABSORPTION OF STUDENTS

Table 1: Significance of Difference in Mean Gain Scores on Cognitive Absorption of Experimental Group and Control Group

Variable	Group	N	Mean	SD	SEM	df	t-value	p-value
Cognitive Absorption	Experimental	30	10.53	2.240	.409	58	10.247	.000
	Control	30	5.93	1.015	.185			

From the table 1, it was inferred that the mean gain score on pre-test and post-test of experimental group was higher (10.53) than the mean gain score of control group (5.93) on cognitive absorption. The high t-value (10.247) also confirms a significant difference between two groups at the post test of cognitive absorption. The calculated p-value was .000, which was less than the alpha level i.e. 0.05. It represents the significant difference in the performance of two groups. Thus, the treatment given to the experimental group in the form of blended e-learning was found to be significant in enhancing the cognitive absorption level of students. Therefore, the Hypothesis H$_{01}$ stating: 'There exists no significant effect of blended e-learning on cognitive absorption of students got rejected'. The figure 1 depicts the difference between the mean scores of two groups at pre-test and post-test of cognitive absorption.
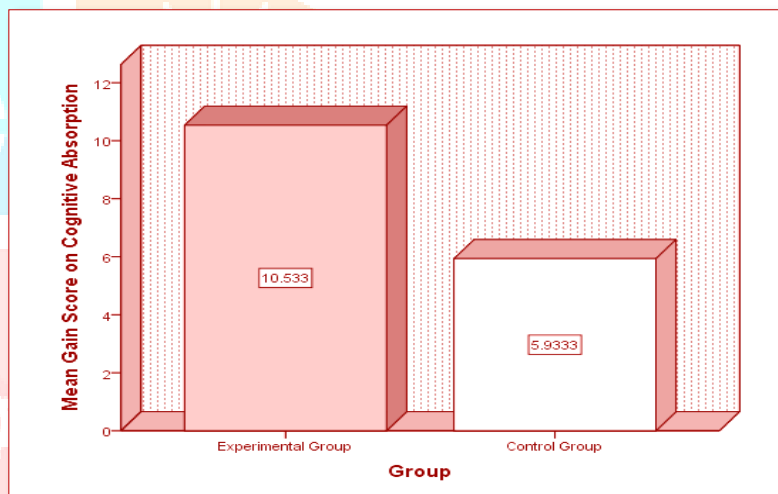

Figure 1: Mean Gain Scores on Cognitive Absorption of Experimental Group and Control Group

The figure 1 shows that mean gain scores on cognitive absorption of experimental group is higher than the mean gain score of control group.

H$_{02}$: THERE EXISTS NO SIGNIFICANT EFFECT OF BLENDED E-LEARNING ON DIMENSIONS OF COGNITIVE ABSORPTION (TEMPORAL DISSOCIATION, FOCUSED IMMERSION, HEIGHTENED ENJOYMENT, CONTROL AND CURIOSITY) OF STUDENTS

Table 2: Significance of Difference in Mean Gain Scores on Dimensions of Cognitive Absorption of Experimental Group and Control Group

Dimension	Group	N	Mean	SD	SEM	df	t-value	p-value
Temporal Dissociation	Experimental	30	1.37	.615	.112	58	2.470	.018
	Control	30	1.07	.254	.046			
Focused Immersion	Experimental	30	2.33	1.241	.227	58	5.477	.000
	Control	30	1.07	.254	.046			
Heightened Enjoyment	Experimental	30	2.40	1.003	.183	58	6.789	.000
	Control	30	1.10	.305	.056			
Control	Experimental	30	1.97	.765	.140	58	6.501	.000
	Control	30	1.03	.183	.033			
Curiosity	Experimental	30	2.47	1.137	.208	58	2.902	.005
	Control	30	1.67	.994	.182			

From the table 2, it was inferred that the mean gain scores on dimensions of Cognitive Absorption (i.e. temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) pre-test and post-test of experimental group were significantly higher than the mean gain score of control group. The calculated high t-value also confirms a significant difference between two groups at post test of temporal dissociation, focused immersion, heightened enjoyment, control and curiosity. The calculated p-value on all the dimensions, being less than the alpha level (i.e.0.05) representing a significant difference in the performance of two groups. Thus, the temporal dissociation, focused immersion, heightened enjoyment, control and curiosity of students enhanced due to the treatment. Therefore, the Hypothesis H$_{02}$ stating: 'There exists no significant effect of blended e-learning on dimensions of cognitive absorption of students' got rejected'. Figure 2 depicts the mean gain scores on all the dimensions of cognitive absorption of students in two groups.
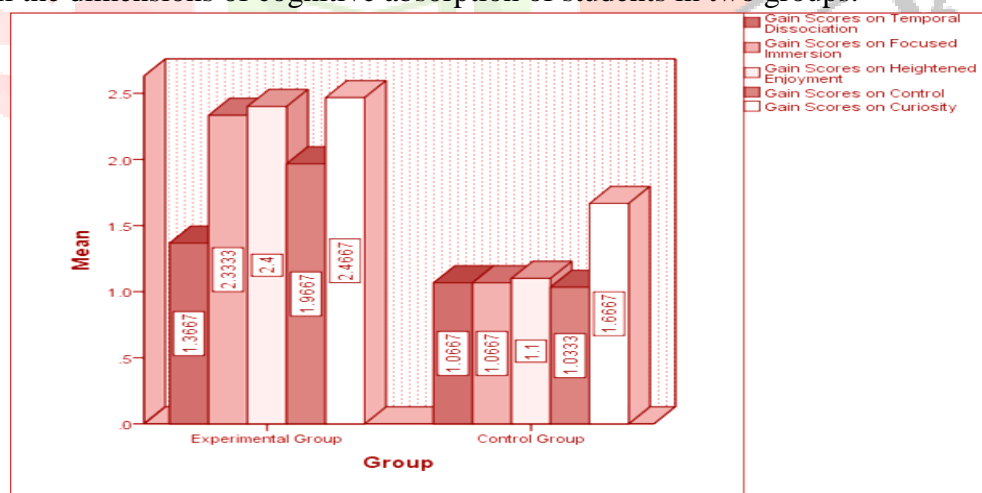

Figure 2: Mean Gain Scores on Temporal Dissociation, Focused Immersion, Heightened Enjoyment, Control and Curiosity of Experimental Group and Control Group

Figure 2 represents that the mean gain scores on temporal dissociation, focused immersion, heightened enjoyment, control and curiosity of experimental group enhanced more than the mean gain score on all the dimensions of cognitive absorption of control group.

H03: THERE EXISTS NO SIGNIFICANT EFFECT OF BLENDED E-LEARNING ON COGNITIVE ABSORPTION WITH RESPECT TO GENDER

Table 3: Effect on Cognitive Absorption among Students of Experimental Group and Control Group with respect to Gender

Tests of Between-Subjects Effects						
Dependent Variable: Cognitive Absorption						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	330.872a	3	110.291	38.158	.000	.672
Intercept	3953.469	1	3953.469	1367.804	.000	.961
Gender	3.803	1	3.803	1.316	.256	.023
Group	326.803	1	326.803	113.066	.000	.669
Gender *Group	9.669	1	9.669	3.345	.073	.056
Error	161.861	56	2.890			
Total	4560.000	60				
Corrected Total	492.733	59				
a. R Squared = .672 (Adjusted R Squared = .654) *Significant F-value at 0.05 level of significance = 4.01						

Table 3 shows the results of 2x2 ANOVA. The calculated F-ratio for the difference in mean gain scores on cognitive absorption among male and female students is 1.316, which is insignificant as its p-value is .256 (greater than the 0.05 level of significance). Thus, it represents an insignificant difference between the female and male at the level of 0.05. Thus, the female and male do not significantly differ on cognitive absorption as well as they do not differ significantly on interaction of blended e-learning and gender on cognitive absorption. Therefore, the Hypothesis H_{03} stating: 'There exists no significant effect of blended e-learning on cognitive absorption of students with respect to gender got accepted'.

H04: THERE EXISTS NO SIGNIFICANT EFFECT OF BLENDED E-LEARNING ON DIMENSIONS OF COGNITIVE ABSORPTION (TEMPORAL DISSOCIATION, FOCUSED IMMERSION, HEIGHTENED ENJOYMENT, CONTROL AND CURIOSITY) WITH RESPECT TO GENDER

Table 4: General Linear Model for Multivariate Tests (2x2 MANOVA)

	Effect	Value	F	df1	df2	Sig.	Partial Eta Squared	Observed Power
Gender * Group	Pillai's Trace	.081	.919b	5.000	52.000	.476	.081	.302
	Wilks' Lambda	.919	.919b	5.000	52.000	.476	.081	.302
	Hotelling's Trace	.088	.919b	5.000	52.000	.476	.081	.302
	Roy's Largest Root	.088	.919b	5.000	52.000	.476	.081	.302

Table 4 shows the results of 2x2 MANOVA on all dimensions of cognitive absorption with respect to gender. It revealed that Wilks'= .919, F (5, 52) = .919, p > .476, partial η2 = .081, observed power = .302. It was ascertained from the results of 2x2 MANOVA that there is no statistical significant interaction effect between gender and group on the combined dimensions of cognitive absorption. The calculated p-value (.476) is greater than the 0.05 level of significance and it is insignificant. The effect size .081 (ηp2) is also insignificant as per guidelines of Cohen (2013). The observed power was .302, which represents that there was 30.2% chance that the results could have come out insignificant. Therefore, the Hypothesis H_{04} stating: 'There exists no significant effect of blended e-learning on dimensions of cognitive absorption with respect to gender got accepted.

CONCLUSION

From the study, it was concluded that the blended e-learning has significant effect on cognitive absorption of students. It also showed significant effect on dimensions of cognitive absorption (temporal dissociation, focused immersion, heightened enjoyment, control and curiosity) of students. Further, it was observed that blended e-learning has no significant effect on cognitive absorption and its dimensions with respect to gender.

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