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Effectiveness of hybrid teaching as blended learning in science on student engagement in relation to creativity of students

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Abstract
The present paper is based on research study undertaken to find out that Effectiveness of Hybrid Teaching as Blended Learning in Science on Student Engagement in Relation to Creativity of Students. An experiment was conducted on 200 students of 9th class in the subject of Science. For the data collection, Student Engagement Test was developed by investigator. Analysis by t-test revealed that the students with high creativity and students with average creativity taught through hybrid teaching as blended learning attained more Science concepts and engagement than the students taught through traditional strategies.

Keywords: hybrid teaching approach, blended learning, student engagement and creativity

Introduction
With the impact of modern technology along with rapid studies of development in modern instructional techniques, there is a strong urge to refine and improve our teaching strategies and instructional techniques with a view to realize the fullest potentialities of the individual learner.

Hybrid Teaching
The terms "blended," "hybrid," "technology-mediated instruction," "web-enhanced instruction," and "mixed-mode instruction" are often used interchangeably in current research literature.

Blended Learning
Blended learning is about engaging students in deeper learning. It's about blending online and face-to-face activities together in a thoughtful way (Online, face-to-face and blended learning Cramer, 2013) [2].

Student Engagement
Student engagement as students' involvement with activities and conditions likely to generate high-quality learning (Coates, 2009) [1].

Creativity
Creativity as the process of having original ideas that have value. Creative work in any field often passes through typical phases. Sometimes what you end up with is not what you had in mind when you started. It's a dynamic process that often involves making new connections, crossing disciplines and using metaphors and analogies (Robinson, 2013) [8].

Related Studies
Linden and Kim (2014) [6] reviewed institutional approaches to blended learning and the ways in which institutions support faculty in the intentional redesign of courses to produce optimal learning. The chapter positions blended learning as a strategic opportunity to engage in organizational learning.
Lester (2013) [5] in a review of the student engagement literature, concluded as it is defined for K-12 and higher education settings. This article first identifies the various definitions of engagement, and then describes the reasons for growing practitioner and academic interest to increase student engagement. The article concludes with a review of some studies of student engagement, engagement practices that improve student learning, and a review of a national test used to measure engagement levels at institutions of higher education.
Kingra (2012) [4] conducted study on the sample of 300students of class 7th of Governemt and Private Secondary schools of Punjab School Education Board from urban locality of Fridkot District of Punjab. ANOVA and t-test were applied. The results indicated that there were significant difference in the level of academic achievement, scientific attitude and creativity among students taught through computer assisted and activity oriented and conventional instructional strategies in science.

Objective of the Study
The study will be conducted keeping in mind the attainment of the following objective:
- To study and compare the effect of hybrid teaching as blended learning and traditional learning strategies on the student engagement for students with high creativity.
- To study and compare the effect of hybrid teaching as blended learning and traditional learning strategies on the student engagement for students with average creativity.

Research Questions
- Will two instructional treatments yield equal mean gain scores of the student engagement for students with high creativity?

- Will two instructional treatments yield comparable mean gain scores of the student engagement for students with average creativity?

Hypotheses

H-1: The two instructional treatments will yield equal mean gain scores of the student engagement for students with high creativity.

H-2: The two instructional treatments will yield comparable mean gain scores of the student engagement for students with average creativity.

Sample

A random sampling technique was used to select the secondary school students. The study was conducted on the sample of 200 students of class IX from the Government Secondary School Kalitran and Government Secondary School Dasgrain with the permission of District Education Officer Ropar and the principals of respected schools.

Research Design

The present study employed on variable of instructional treatments whish was studied at two levels namely experimental which was taught by hybrid teaching as blended learning and control group which was taught by traditional instruction. The variable of creativity was studied at high and average creativity level.

Tools Used

Lesson plans developed on the basis of hybrid teaching approach.

1. Student engagement test was developed and standardized by investigator.
2. Divergent Production Ability Test by Sharma (2006) was used.

Statistical Techniques Used

Mean, Standard Deviation and t- test were employed to analysis data.

Methodology

Two main stages were adopted as the procedure of the experiment. These stages were:

Stage I: Selecting the sample

Stage II: Procedure of the study

Stage I: Selecting the sample

A random sampling technique was used to select the secondary school students. The study was conducted on the sample of 200 students of class IX from the Government Secondary School Kalitran and Government Secondary School Dasgrain with the permission of District Education Officer Ropar and the principals of respected schools.

Stage II: Procedure of the study

The experiment was conducted in four phases as stated below:

Phase I: Administration of Creativity Test: Group was equated on the basis of creativity test. 200 Students were divided into two groups each having 100 students with high creativity and 100 students with average creativity. The investigator was continue with the test of creativity on students until he will find 100 each students with high and average creativity. Each group of 100 students were again be randomly divided into 50 students for four groups i.e. experimental and control.

Phase II: Administration of Pre-Test: Students' Engagement Test was used as a Pre-Test.

Phase III: Implementing the instructional programme: The experimental group was taught through hybrid teaching as **blended learning.** The Control Group (CG) was taught by the investigator himself in the conventional way.

Phase IV: Administration of the Post – Test: Students' Engagement Test was used as a Post-Test.

Phase V: Scoring: All the tools were scored according to their prescribed scoring keys and data was subjected to statistical analysis.

Data Analysis

Hypothesis the two instructional treatments will yield equal mean gain scores of the student engagement for students with high creativity. The result pertaining to this hypothesis are presented in the table-1

Table 1: Table 5.34 showing t-ratio among the two instructional treatments on gain scores of the student engagement for students with high creativity.

Variable	Group	N	Mean	SD	df	t	Level of Significance
Student Engagement	Control	50	7.6800	4.15240	98	-9.655	Significant at.01 level (t= 2.63)
	Experimental	50	19.1600	7.31049			

Interpretation of Result of Table -1

The t-ratio of 9.655 between control and experiment group for gain scores in the subject of Science was found significant at. 01 level. This inferred that there was a statistically significant difference in gain scores of the experimental group taught through hybrid teaching as blended learning and control group taught through traditional strategies. Experimental group taught through hybrid teaching as blended learning had higher mean scores than control group taught through traditional strategies.

This result showed that the students taught through hybrid teaching as blended learning attained more Science concepts and students with high creativity were engaged more than the students taught through traditional strategies.

Therefore, the hypothesis H-1 two instructional treatments will yield equal mean gain scores of the student engagement for students with high creativity stands rejected even at. 01 level of confidence.

Hypothesis the two instructional treatments will yield comparable mean gain scores of the student engagement for students with average creativity. The result pertaining to this hypothesis are presented in the table-2

Table 2: showing t-ratio among the two instructional treatments on gain scores of the student engagement for students with average creativity.

Variable	Group	N	Mean	SD	df	t	Level of Significance
Student Engagement	Control	50	7.4200	4.39429	98	-9.080	Significant at. 01 level (t= 2.63)
	Experimental	50	16.5600	5.59942			

Interpretation of Result from Table-1

The t-ratio of 9.080 between control and experiment group for gain scores in the subject of Science was found significant at. 01 level. This inferred that there was a statistically significant difference in gain scores of the experimental group taught through hybrid teaching as blended learning and control group taught through traditional strategies. Experimental group taught through hybrid teaching as blended learning had higher mean scores than control group taught through traditional strategies.

This result showed that the students with average creativity taught through hybrid teaching as blended learning attained more Science concepts and engagement than the students taught through traditional strategies.

Therefore, the hypothesis two instructional treatments will yield comparable mean gain scores of the student engagement for students with average creativity stands rejected even at. 01 level of confidence.

Conclusion

1. Students taught through hybrid teaching as blended learning attained more Science concepts and students with high creativity and students with average creativity engaged more than the students taught through traditional strategies.
2. Hybrid teaching as blended learning is more useful for gain score of high and average creative students than control group taught through traditional strategies. The students in experimental group actively participated in the classroom activities and show effective result as compared to control group.
3. The results suggested that hybrid teaching as blended learning has overall positive effect on student engagement.

Educational Implications

1. To create such a classroom environment where new ideas and knowledge can be shared between teachers and students.
2. To enable students to explore new ideas through setting connection with their previous knowledge.
3. To prepare students for divergent and critical thinking skills.

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