

Effectiveness of Moodle- LMS on the Academic Achievement and Student Satisfaction among IX grade Mathematics Learners

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Abstract

The COVID-19 has changed the norms of life whether these are social norms, workplace norms and educational norms. The increased usage of online teaching - learning tools is a new change in education. The new way of learning has been triggered by COVID-19. The teaching has direct effect on students' performance and student satisfaction. So, there is need to conduct study to see whether online teaching affects student's achievement and student satisfaction positively and negatively. The present study has been designed to see the effect of Moodle on academic achievement and student satisfaction of IX grade students. In order to conduct this experiment, 2 schools (One is PSEB and Second is CBSE) of Amritsar district were selected randomly. From these two schools, 460 students of IX grade of PSEB and CBSE schools were taken as sample to conduct this study. Raven Progressive matrices test of intelligence (1998), Achievement test (prepared by investigator) and student satisfaction scale (prepared by the investigator) were administered on selected sample. Descriptive statistics (Means, S.D's,) and Inferential Statistics (t-test) were calculated to understand the nature of data and test the hypotheses respectively. This study indicated that treatment significantly effects the achievement of IX Grade students in mathematics. It means that teaching with Moodle learning management system significantly improve the performance of IX grade students. This study also indicated that the student satisfaction of IX grade students is significantly affected by the Moodle.

keywords: Learning Management System, Moodle, Student Satisfaction, Achievement

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Introduction

Today, the future of higher education is online education and on-demand education. In this technological era, the teacher has to remain update not only in the content. In fact, teacher need to unlearn old teaching pedagogy and relearn the digital teaching methods for holistic development of students. Online teaching is unbiased and fits with the time and pace of all the students. In the upcoming time, to make teaching-learning process more interactive for the students, there is need to incorporate videos and online study material along with normal teaching.

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In this digital era, teacher can use different learning management system to teach the students. The most representative e-learning application that can be open source and freely available in comparison of other commercial products. The most important LMS are Moodle, Chamilo, open

edX, Totara Learn and Canvas. The LMS is mostly used for online education as well as to supplement face to face courses. The most common usage of LMS is to post course's syllabus, announcement, home assignment and project, lecture notes and slides for the students to access online material.

Moodle

Moodle (Modular Object-Oriented Dynamic Learning Environment) is basically an Open-Source e-learning platform. Moodle is a Course Management System (CMS) - a software package designed to help educators to create quality online courses. In Moodle, the feature of instant messaging and message alerts act as fastest and efficient way to get in touch with students and teachers. Teacher uses Moodle portal to enroll the students, make attendance list, create courses, deliver learning materials, give quizzes, send feedback. Moreover, Moodle has discussion board which is used by the teacher for discussion. Moodle promotes collaborative teamwork through discussion forum, messaging allowing students to work together. In Moodle, teacher and student share their ideas, ask the questions, students and teacher respond to that queries. Students submit their assignment electronically to teacher and received their grades based on the pre-established criteria. The educator can share the content by combining text, images and embedded video easily. Moreover, teacher can update the content at any time. The teacher can communicate with their students by using Moodle. Teacher can track the progress of every student with the help of Moodle. There are numerous benefits of using Moodle on the part of students. The students feel that it is easy to use Moodle. The content of Moodle is quite helpful to engage the students as it is combination of audio-visual content. Students can check their own progress by attempting quiz and keep the track of their progress.

Student Satisfaction

Student satisfaction is defined as the gap what the student experience and their expectations. Student satisfaction is an important concept which is used by education administrator, policymakers and instructors. Sweeney and Ingram (2001) define satisfaction as, "the perception of enjoyment and accomplishment in the learning environment". Wu et al. (2010) define satisfaction as "the sum of a student's behavioral beliefs and attitudes that result from aggregating all the benefits that a student receives from using the blended system". O'Leary and Quinlan (2007) provide a marketing definition of student satisfaction as "an emotional response that can be induced by actual product, service, or process quality or some combination of product and service quality" (p. 135). The factors which determine student's satisfaction are categorized into six categories: faculty, institution, individual student factors, interaction/ communication factors, course factors, and learning environment factors. In online learning, student satisfaction is linked with interaction and communication, course design, learning environment.

Academic Achievement

The performance measure of any educational system is students' academic achievement. Academic achievement is the ability to acquisition of the planned outcome. The key criteria to evaluate one's total potentialities and capabilities is academic achievement. Crow and Crow (1969), defined "academic achievement as the extent to which a learner is profiting from instructions in a given area of learning i.e., achievement is reflected by the extent to which skill or knowledge has been imparted to him". Tounesia (2012) defines "Academic achievement as a set

of grades that could be obtained from the daily and monthly exams that shows students' abilities of understanding curricula and applying them in daily life (2012). Now-a-day, the achievement test has gained the importance to measure one's ability. The achievement test is used to measure the nature and extent of student leaning in a particular subject. Student achievement is not only product of cognitive abilities. Students' interest, teachers' methodology of teaching, socio-economic conditions, family set up and some other psychological factors also affect directly and indirectly academic achievement.

Review of Related Literature

Lorenzo and Moore (2002) found that student satisfaction is outcome of responsive, timely and personalized services, high-quality learning outcomes, academic and administrative support services and learner interaction and collaboration. The study of Levy (2003) revealed that student's satisfaction is an important parameter to measure effectiveness of e-learning. Yang and Cornelius (2004) found that poorly designed course and lack of participation by instructor in discussion or responded to questions within a very limited time are reasons which make student frustrated. Sun, et al. (2008) found that learners' computer/technology anxiety, instructor attitude towards e-learning, course flexibility and quality, perceived usefulness of the LMS and ease of use are the factors that influence student satisfaction. Cao et al. (2009) link constructivism (i.e., learning occurs through interaction) with three types of interaction identified learner-instructor, learner-learner, learner-content has s strong effect on student course with web sites. In his study, Lee (2010) found that the essential factor of student satisfaction in online learning is timely feedback from the instructor. Naveh et al. (2010) found that significant correlation exists between LMS use and student satisfaction.

Baig (2011) found that students taught through online tools and online learning environment achieved more scores in achievement test as compared to student taught through face-to-face teaching. Karami (2012) showed that employees examined had considerable satisfaction with respect to Web- based training courses and messaging communications. The study of Bell and Federman (2013) indicated that Course structure, instructor feedback, self-motivation, learning style, interaction, and instructor facilitation can affect students 'perceived satisfaction of online learning. Kuo, Walker, Belland et al. (2014) showed that learner-instructor interaction and learner-learner interactions were the significant predictors of student satisfaction. Umek et al. (2015) found that significant correlation between Moodle e-learning platform and students ' performance and Moodle and student satisfaction. The study of Feizabadi et al. (2016) revealed that no significant difference between the experimental group and the control group and the software Moodle has had an impact on language learning. Moodle as one of the new tools, the ability to change the teaching and learning is significant and can be fair use quality teaching and learning in education systems improved.

Horvat et al. (2017) found that hat male and female students are equally satisfied with Moodle LMS quality characteristics. They also found that student satisfaction is dependent upon how much time is spent on Moodle by the student. Ijrish and Shubber (2018) found that experimental group performed well as compared to control group. Nawaz (2019) found that hat System Quality, Information Quality, Services Quality were significantly impacting System Use and User Satisfaction resulting in effectiveness in students 'learning using LMS. Oguguo et al.

(2020) found that students taught using LMS (Moodle) performed better than those exposed to the CAI4ME Package. Prasetya et al. (2020) found that the students were satisfied with the e-learning course in vocational learning media.

Statement of the Problem

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Objectives of the study

The following objectives have been framed:

1. To study the effect of Moodle on the achievement gain scores of IX grade students.
2. To study the effect of Moodle on the student satisfaction gain scores of IX grade students.

Hypotheses of the study

The following Hypotheses have been framed:

H₁: There exists no significant difference in mean achievement gain scores of IX grade students taught through Moodle and normal classroom teaching method.

H₂: There exists no significant difference in mean student satisfaction gain scores of IX grade students taught through Moodle and normal classroom teaching method.

Methodology

Sample

Initially, two schools, one is PSEB and second is CBSE were selected from Amritsar district, Punjab state. The sample were 460 in number. 230 students of IX grade students were taken from PSEB school and 230 were selected from CBSE school.

Design

The present study comes under the experimental design. Instructional Methods (Moodle and Normal Classroom teaching method) is treated as independent variables, whereas achievement in Mathematics and student satisfaction are studied as dependent variable.

Tools

- Raven Progressive Matrices Test of Intelligence (1998)
- Achievement test (Prepared by the investigator)
- Student Satisfaction Scale (prepared by the investigator)
- E-content was prepared for Moodle

Procedure

In order to carry out the experiment, two schools were selected randomly from Amritsar district, Punjab state. The students of IX grade of selected schools were taken as sample to conduct the study. In order to nullify the effect of Intelligence on achievement of students, Firstly Raven Progressive Matrices test of Intelligence (1998) were administered on the selected sample. After that on the basis of Intelligence scores, Group matching were done. the investigator formed two group i.e experimental and control group by using Group matching method. In Group matching method, the groups are formed by comparing the mean of two groups. In this study, there are two

experimental groups which consisted of 230 students and two control groups which consisted of 230 students. Student satisfaction scale and achievement test were administered on two groups before starting the experiment. After that treatment groups were taught by the investigator with the help of Moodle and control group were taught by school teachers with the help of normal classroom teaching method. At the end of treatment, again achievement test and student satisfaction scale were administered on two groups. Scoring was done. In order to analyses the data and to arrive at conclusion, descriptive and inferential statistics were calculated

Statistical Techniques

Mean, Standard Deviation and t- ratio were calculated to treat the raw scores and arrive at conclusions.

Result and Discussion

The values of means, Standard deviation and t-value of achievement gain score of subgroup have been given in Table 1

TABLE 1
MEAN, STANDARD DEVIATION AND t-VALUE OF ACADEMIC GAIN SCORES OF IX GRADE STUDENTS

Type of Group	N	Mean	S.D	Mean difference	S.Ed	Df	t-value
Experimental Group	230	18.2565	7.02518	14.6261	.55956	458	26.14**
Control Group	230	3.6304	4.76046				

**Significant at 0.01 level

The table 1 clearly reflects the value of Descriptive Statistics. The mean and standard deviation of achievement gain scores of experimental group is 18.2565 and 7.02518 respectively. The calculated mean and standard deviation of achievement gain scores of control group is 3.6304 and 4.76046 respectively. In order to find the significant difference, exist between the mean achievement gain score of experimental and control group, t-test was calculated. The t- value is 26.14 which is found to be significant at higher level of confidence. It means that teaching through Moodle significantly affects achievement gain score of students. After carefully examination of table1, it is concluded that mean of experimental group is higher than the mean of control group. It does not support the hypothesis. Hence the hypothesis “There exists no significant difference between mean achievement gain scores of IX grade students taught through Moodle and normal classroom teaching method” was not rejected.

A visual representation of above result has been given in figure-1

FIGURE -1
MEAN DIFFERENCE OF ACADEMIC GAIN SCORES OF IX GRADE STUDENTS OF GROUPS

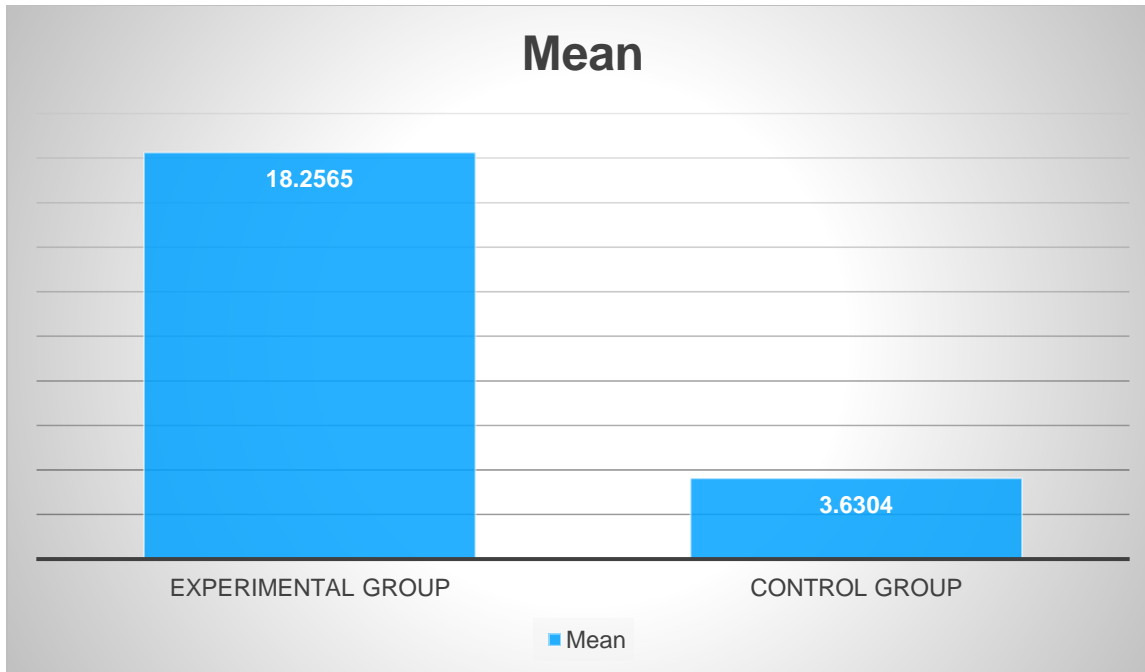


TABLE 2
MEAN, STANDARD DEVIATION AND t-VALUE OF STUDENT SATISFACTION GAIN SCORES OF IX GRADE STUDENTS

Type of Group	N	Mean	S.D	Mean difference	S.Ed	Df	t-value
Experimental Group	230	50.1652	14.94557	32.7826	1.341899	458	24.430**
Control Group	230	17.3826	13.81227				

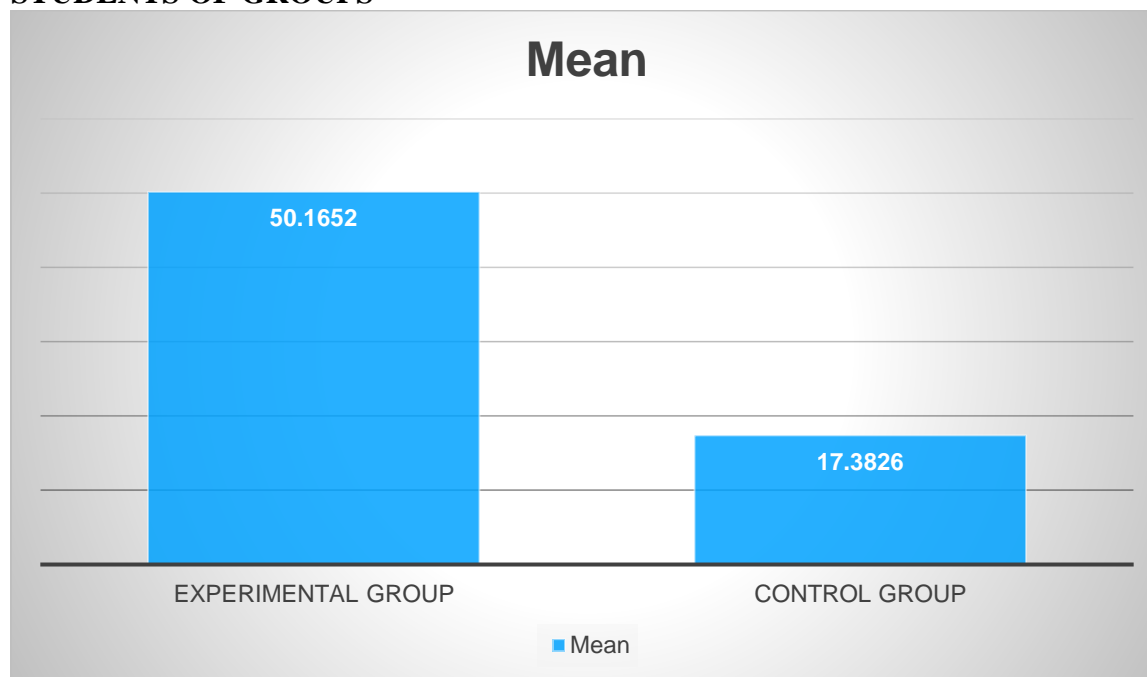
**Significant at 0.01 level

The table 2 revealed that value of Descriptive Statistics along with t-value. The mean and standard deviation of experimental group of student satisfaction gain scores is 50.1652 and 14.94557 respectively. The control group is having mean 17.3826 and standard deviation 13.81227 of student satisfaction gain scores. The t-test was administered on data in order to find out the difference in mean student satisfaction gain scores of experimental and control group of experimental. The t-value is 24.430 which is found to be significant at 0.01 level. It means that teaching through Moodle significantly affect the student satisfaction of IX grade students. From the table 1, it is clearly seen that mean of experimental group in student satisfaction gain scores is higher than the mean of control group. It does not support the hypothesis. Hence the hypothesis

“There exists no significant difference between mean student satisfaction gain scores of IX grade students taught through Moodle and normal classroom teaching method” was not rejected. A graphical representation of above result has been given in figure -2

FIGURE -2

MEAN DIFFERENCE OF STUDENT SATISFACTION GAIN SCORES OF IX GRADE STUDENTS OF GROUPS



Discussion on Results and Educational Implications

The first finding of the study is that there exists significant difference in achievement gain score of experimental and control group. It means that achievement of students is increased with Moodle. This findings intune with study of Al-Ani (2013), Falleiro (2013), Keshavarz et al. (2013), Chadha and Sidhu (2016) , Marikar et al. (2016), Umek et al. (2017) , Ijrish and Shubber (2017) and Elfaki et al. (2019) , Alameri et al. (2020). They found that Moodle significantly affect the achievement of students. The second finding of this study is that student satisfaction significantly affected by teaching through Moodle. The present result is in tune with the study of Naveh et al. (2010) , Bell and Federman (2013), Kuo et al. (2014), Umek et al. (2015) , Oguguo et al. (2020). They found that usage of Moodle significantly affects student satisfaction. The probable reason may be that Moodle has very interesting features like chat box, online quiz, discussion forum, availability of course material in audio and video content. The module developed by the investigator incorporated with the video related to content. Maximum examples are given to student. The most striking result of this study is that online quiz provides external motivation to students. They read content material with proper interest to achieve the more scores in online quiz so that they can show their friends that they achieve more marks as compared to other students in online quiz. The second possible reason is that availability of chat box in Moodle. In my study, I have used in between chat box so that students feel engaged in their learning. The third possible reason that course content contained video and images which quite helpful to engage the students which ultimately increase the performance of students. The fourth possible reason is that most of

the students first time are working on computers. They feel something new in routine teaching. That's why they feel motivated to learn through Moodle. The educational implication of this study is that there is need to train the teachers to use Moodle for teaching. It is not duty of Government. In fact, different educational institutions Moodle organize orientation programmes for their teachers so that they can become able to use Moodle for their teaching. Moreover, there is need to develop positive attitude among teachers towards usage of Moodle for teaching. Additionally, higher educational bodies can organize workshops on Moodle for teachers.

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