



Differential Study On Impact Of Moodle Package In Biology For IX Standard Students In Terms Of Certain Selected Variables

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ABSTRACT

This study investigated the impact of Moodle-supported instruction on biology learning, considering the effects of students' gender, study habits, and access to the internet. A sample of 99 students from 9th Standard (49 in the experimental group, 50 in the control group) participated. The experimental group used Moodle with interactive learning modules, quizzes, and discussion forums, while the control group received traditional instruction. Data were collected on study habits, gender, data usage, and post-test biology scores. Results indicated that Moodle-supported instruction significantly improved biology achievement.

Keywords: Moodle, Biology, IX Standard Students, Online - Learning, Learning Management System, Study habits, Gender, Data usage, Post test scores, Experimental group

Introduction

The integration of technology into education has transformed learning experiences across disciplines. Moodle, a widely used Learning Management System (LMS), provides interactive modules, quizzes, and forums that allow students to engage with content asynchronously and at their own pace. In science education, particularly biology, Moodle facilitates access to multimedia resources and virtual laboratories, enhancing understanding of complex concepts. However, the effectiveness of Moodle-supported learning may depend on learner characteristics and technological access. Factors such as gender, study habits, and internet availability can influence how students engage with Moodle and, consequently, their academic achievement. This study examines the impact of Moodle-supported biology instruction on student performance, while considering the role of gender, study habits, and internet access.

Need for the Study

With the growing use of ICT in education, digital platforms like **Moodle** are increasingly being used to enhance classroom teaching. Biology at the IX standard level includes complex and abstract concepts that require interactive and visual learning methods. A Moodle package can provide multimedia content, self-learning opportunities, and continuous assessment, which may improve students' academic achievement. However, students differ in terms of gender, Study habits, and Data usage and achievement level. There is limited research examining the differential impact of a Moodle package in Biology among IX standard students based on these selected variables. Therefore, this study is needed to determine the effectiveness of Moodle and to understand how different groups of students benefit from it

Title of the Study:

Differential study on impact of Moodle package in biology for IX standard students in terms of certain selected variables

Objectives of the Study

- To find out the significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on gender.

- To find out the significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on study habits.
- To find out the significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on data usage

Hypotheses of the Study

- H₀₁ - There is no significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on gender.
- H₀₂ - There is no significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on study habits.
- H₀₃ - There is no significant difference in the post test scores of experimental groups (MOODLE instruction) IX standard students in biology based on data usage.

Methods

Research Design

Pre-test – Post-test Equalant Group Experimental Design was employed.

- Experimental group (n = 49): Received structured Moodle-supported instruction with interactive modules, quizzes, and discussion forums.
- Control group (n = 50): Received traditional instruction with access to standard Moodle materials without structured interventions.

Variables:

- Independent variable: Mode of instruction (Moodle-supported vs traditional)
- Dependent variable: Biology achievement (post-test scores)
- Moderators: Gender, study habits, internet access

Tool Used

A criterion reference Achievement Test in Biology was constructed and validated by the investigator. The test consisted of multiple-choice questions covering selected Biology units.

Procedure

1. Pre-test was administered to both groups.
2. The Experimental group was taught using the Moodle package for 6 weeks.
3. The Control group received conventional classroom teaching.
4. Post-test was administered to both groups.

Statistical Techniques Used

- Mean and Standard Deviation
- t-test

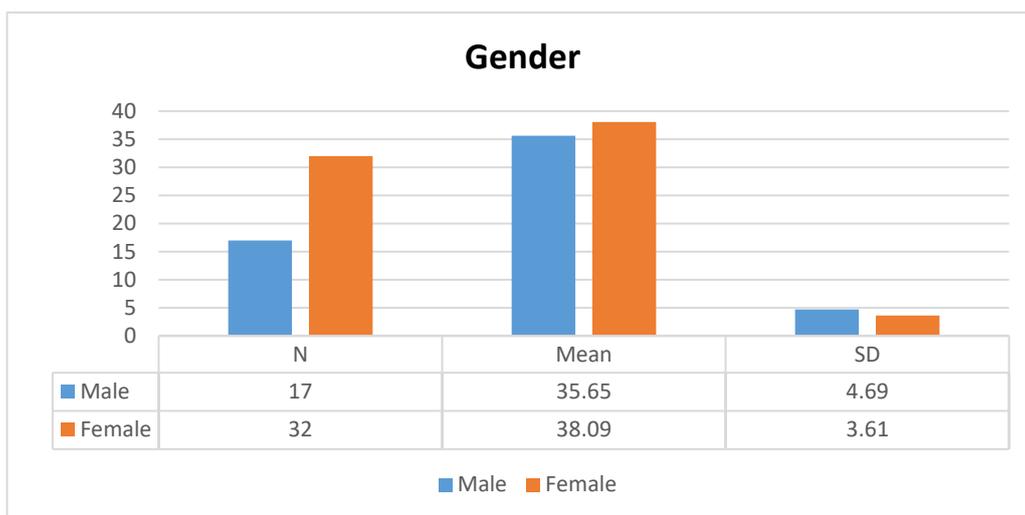
H₀₁ – There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on gender.

Table 1- Significance of difference in the mean achievement in the post-test scores of Experimental group (MOODLE instruction) IX standard students in biology based on gender

| Gender | N | Mean | SD | 't' Value | df | Level of Significance |
|--------|----|-------|------|-----------|------------------------------|-----------------------|
| Male | 17 | 35.65 | 4.69 | 1.876 | 2 for df of 47 at 0.05 level | Not Significant |
| Female | 32 | 38.09 | 3.61 | | | |

From the above table, it is evident that the mean value of male IX standard students is 35.65 with standard deviation 4.69. The mean value of female IX standard students is 39.09 with standard deviation 3.61. The calculated 't' value is 1.876. It is less than the critical value 2 for the degrees of freedom 47 at 0.05 level. It is not significant. Hence, the null hypothesis stated as "There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on gender" is accepted.

Figure 1 Showing the Significance of difference in the mean achievement in the post-test scores of experimental group (MOODLE instruction) IX standard students in biology based on Gender



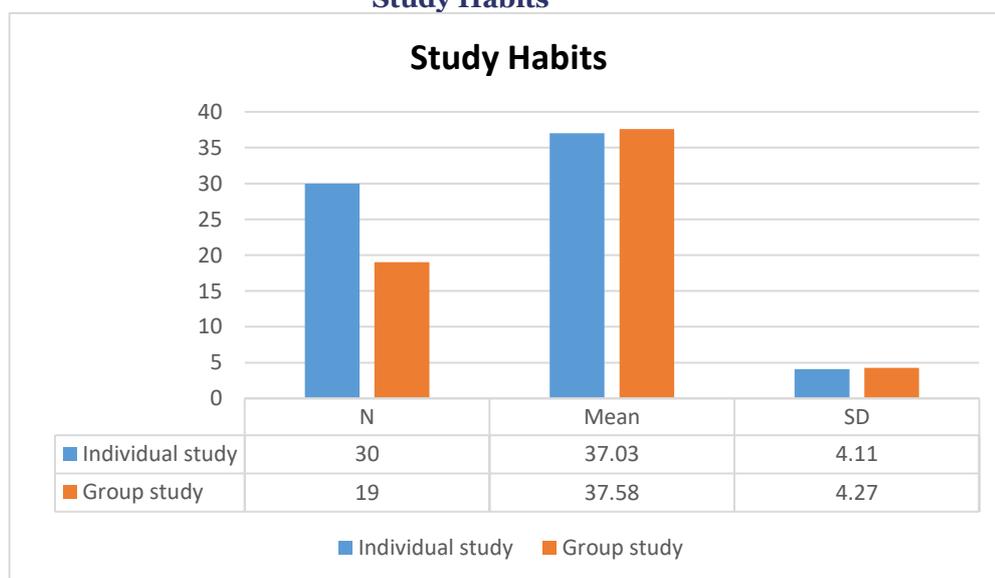
H₀₂ – There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on study habits.

Table 2 - Significance of difference in the mean achievement in the post-test scores of experimental group (MOODLE instruction) IX standard students in biology based on study habits

| Study habits | N | Mean | SD | 't' Value | df | Level of Significance |
|------------------|----|-------|------|-----------|------------------------------|-----------------------|
| Individual study | 30 | 37.03 | 4.11 | 0.442 | 2 for df of 47 at 0.05 level | Not Significant |
| Group study | 19 | 37.58 | 4.27 | | | |

From the above table, it is evident that the mean value of IX standard students who study individually is 37.03 with standard deviation 4.11. The mean value of IX standard students who study in groups is 37.58 with standard deviation 4.27. The calculated 't' value is 0.442. It is less than the critical value 2 for the degrees of freedom 47 at 0.05 level. It is not significant. Hence, the null hypothesis stated as "There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on study habits" is accepted.

Figure 2 Showing the Significance of difference in the mean achievement in the post-test scores of experimental group (MOODLE instruction) IX standard students in biology based on Study Habits



H₀₃ – There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on data usage.

Table 3 - Significance of difference in the mean achievement in the post-test scores of experimental group (MOODLE instruction) IX standard students in biology based on data usage

| Data Usage | N | Mean | SD | 't' Value | df | Level of Significance |
|------------|----|-------|------|-----------|------------------------------|-----------------------|
| Below 2 GB | 22 | 36.32 | 4.82 | 1.381 | 2 for df of 47 at 0.05 level | Not Significant |
| Above 2 GB | 27 | 38.00 | 3.41 | | | |

From the above table, it is evident that the mean value of IX standard students whose data usage is below 2 GB is 36.32 with standard deviation 4.82. The mean value of IX standard students whose data usage is above 2 GB is 38.00 with standard deviation 3.41. The calculated 't' value is 1.381. It is less than the critical value 2 for the degrees of freedom 47 at 0.05 level. It is not significant. Hence, the null hypothesis stated as "There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on data usage" is accepted.

Figure 3 Showing the Significance of difference in the mean achievement in the post-test scores of experimental group (MOODLE instruction) IX standard students in biology based on Data Usage



Findings of the Study

Following are the findings of the study

- There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on gender –**Hypothesis accepted**
- There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on study habits –**Hypothesis accepted.**
- There is no significant difference in the post test scores of experimental group (MOODLE instruction) IX standard students in biology based on data usage –**Hypothesis accepted**

Educational Implications

- Teachers should design Moodle modules that allow students to access Biology resources and self-assessment quizzes at their own pace, fostering the independent study habits necessary for secondary education success.
- School administrations should adopt Moodle-based instructional packages as a proven strategy to significantly raise student achievement scores compared to traditional "chalk-and-talk" lecture methods.
- Biology instructors should leverage Moodle's automated grading systems to provide instant feedback on student work, which helps learners identify and correct scientific misconceptions in real-time.

Conclusion

The study concludes that the Moodle learning package is an effective instructional tool that positively influences the perception of IX standard students towards learning Biology. The survey method helped in

understanding students' perceptions and learning outcomes. The integration of Moodle in secondary education can significantly improve the quality of teaching and learning.

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