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Effect of Multimedia Instructional Learning Package on 9th Standard Students' Attitude towards Biology Learning of Bangalore Rural District

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Abstract: This study examines the effect of Multimedia Instructional Learning Package in biology teaching on 9th standard students' attitude towards biology. The research focused on 9th standard students from private school, Gurukula International School (GIS), Godlumuddenahalli, Vijayapura Hobli, Devanahalli Taluk, Bangalore Rural District. A sample of 40 students was divided into two groups: an experimental group receiving teaching instruction through Multimedia Instructional Learning Package (N=20) and a control group receiving instruction through traditional method (N=20). The intervention included animations, video, simulations, interactive activities, PowerPoint presentations along with user-friendly digital platforms like CDS, Pen drives. A Randomized Matching Control Group Pre-test Post-Test design was employed with 40 subjects out of total subjects. The Attitude towards Biology Learning Scale, developed by the researcher, measured students' attitude through 60 items rated on a Likert scale from 5 (Strongly Agree) to 1 (Strongly Disagree). The scale's reliability was confirmed through Split Half Method and Test-Retest method. Paired t-test and independent 't' test was conducted for inferential analysis. The results were obtained with the help of SPSS Package and MS Excel, the level of significance was fixed at 0.05 and 0.01 levels. The results found that, the traditional teaching method may not have a substantial impact on the development of students' attitude towards biology learning and the MILP-based teaching strategy has a positive and significant effect on the attitude development of 9th standard students. The comparative analysis of both groups demonstrate that, while the traditional teaching method did not lead to a significant improvement in students' attitude towards Biology learning, the Multimedia Instructional Learning Package (MILP) resulted in a substantial positive change. The results emphasize the effectiveness of multimedia-based strategies in making Biology learning more engaging and appealing to students.

Index Terms – Attitude, Biology, Effect, Multimedia Instructional Learning Package, 9th standard students

1. INTRODUCTION

The rapid development of digital technology has revolutionized the field of education, leading to the integration of multimedia instructional strategies in teaching various subjects, including Biology also. Traditional teaching method often reliant on textbook-based instructions are being increasingly supplemented or replaced by multimedia learning approaches. These approaches incorporate elements such as animations, simulations, videos and interactive applications to create an engaging and immersive learning experience. The shift towards multimedia-based instruction aligns with constructivist learning theories, which emphasize active engagement and multi-sensory learning as key components of effective education.

In the context of Biology education, multimedia instructional strategies have been shown to enhance students' conceptual understanding, critical thinking skills and interest in the subject. Unlike conventional teaching approaches, multimedia-based instruction provides dynamic representations of complex biological processes, making abstract concepts more tangible and comprehensible. Additionally, interactive learning environments foster deeper cognitive engagement and improve the knowledge retention among students.

Given these advantages, there is a growing interest in examining the impact of multimedia instructional strategies on students' attitude towards biology learning, particularly at the secondary level education. While numerous studies have demonstrated the effectiveness of multimedia-based learning in improving students' academic achievement, research focusing on its influence on students' attitude towards biology learning remains limited. This study seeks to address this gap by investigating the effects of

Multimedia Instructional Learning Package on the attitude of 9th standard students of Bangalore Rural District. Understanding how multimedia instruction influences students' perceptions and attitude towards biology learning provides valuable insights for educators and policymakers in designing more effective and engaging science curricula.

2. REVIEW OF RELATED LITERATURE

Several empirical studies have demonstrated the efficacy of multimedia instructional strategies in improving students' learning outcomes, critical thinking skills and scientific attitude. This review explores various studies that highlight the significance of multimedia-based teaching methods in Biology education.

- **Musa et al. (2023)** conducted a study to examine the effects of multimedia instructional strategies on students' critical thinking and attitude towards Basic Science. The study, which involved 85 students from two co-educational schools in Nigeria, used a quasi-experimental research design. The results revealed a significant difference in the critical thinking scores and attitude of students, who were taught using multimedia instructional strategies compared to those taught through conventional methods.

- **Mahawar & Bansal (2022)** investigated the impact of a multimedia approach on the teaching-learning process in Biology. The study, conducted in Jaipur district, involved 60 students divided into a control group (traditional method) and an experimental group (multimedia-based instruction). A significant difference was observed between the post-test scores of the two groups, with the experimental group outperforming the control group. The findings suggested that, multimedia-based teaching methods significantly improve students' learning outcomes in Biology by making lessons more interactive, engaging and easy to understand.

- **Binwal (2020)** explored the attitude of 9th-grade students towards science and their academic achievement. The study involved 100 students from different government schools in Almora, Uttarakhand. Using a Scientific Attitude Scale (SAS) and statistical analysis, the findings indicated that, students from urban backgrounds exhibited more positive attitude towards science compared to their rural counterparts. Additionally, students with higher academic performance in the previous class showed more favorable attitude towards science. This study highlighted the correlation between students' scientific attitude and their academic achievement, further emphasizing the importance of instructional strategies that positively influences students' perceptions of science.

- **Akinbadewa & Sofowora (2020)** examined the effectiveness of multimedia learning package in improving students' attitude towards learning Biology in Nigerian secondary schools. Using a mixed-method research approach, the study involved 80 students divided into three groups (one control and two experimental groups). The study concluded that, multimedia instructional strategies enhance students' interest, engagement and retention of concepts, making them an effective alternative to traditional teaching approaches.

- **Vebrianto & Osman (2011)** investigated the impact of multiple media instruction on students' Science Process Skills (SPS) and academic achievement in Indonesia. The study, which involved 96 students, used a quasi-experimental design with different instructional modules, including ICT-based and environmental modules. The study concluded that multimedia-based teaching methods significantly improve students' scientific knowledge and process skills, further supporting the integration of digital tools in science education.

Overview of Studies and Research Gap: While several studies have highlighted the benefits of multimedia instructional strategies in science education, there is limited research focusing specifically on their impact on the academic achievement of 9th-grade students in Biology. Most studies have emphasized students' attitude, engagement and critical thinking skills rather than directly measuring academic performance in Biology. Previous research has been conducted predominantly in Nigeria, Indonesia and other international settings, with fewer studies examining on Multimedia Instructional Learning Package (MILP) in the Indian educational settings. Furthermore, studies focusing on Bangalore Rural District are scarce, highlighting the need for empirical validation in this specific geographic and socio-educational context. This study aims to fill this gap by examining the effectiveness of MILP-based

teaching strategies in enhancing academic achievement in Biology among 9th-standard students in Bangalore Rural District, providing empirical evidence that informs educational policies and teaching methodologies.

3. SIGNIFICANCE OF THE STUDY

The significance of this study lies in its potential to enhance students' attitude towards biology learning through Multimedia Instructional Learning Package. Traditional teaching methods often fail to engage students effectively, leading to lack of interest in the subject. By integrating multimedia elements such as animations, videos and interactive simulations, this study aims to make biology learning more engaging, visually appealing and easier to understand. A positive attitude towards biology improves students' motivation, participation and overall academic performance. Additionally, the findings can help educators and policymakers in Bangalore Rural District adopt innovative teaching strategies to enhance science education at the secondary school level.

4. STATEMENT OF THE PROBLEM

The study intended to examine the effect of Multimedia Instructional Learning Package on 9th standard students' attitude towards biology learning of Bangalore Rural District.

5. OBJECTIVES

1. To study the effect of traditional teaching method on 9th standard students' attitude toward biology learning, as measured by the scores of ASTBL (Attitude Scale towards Biology Learning) Scale developed by the researcher.
2. To study the effect of the Multimedia Instructional Learning Packages (MILP) on 9th standard students' attitude towards biology learning, as measured by the scores of the ASTBL Scale developed by the researcher.

6. HYPOTHESES

1. There is no significant difference in the scores of attitude towards biology learning of 9th standard students in the Control Group between the pre-test and post-test who learned through the traditional method.
2. There is no significant difference in the scores of attitude towards biology learning of 9th standard students in the Experimental Group between the pre-test and post-test who learned through the Multimedia Instructional Learning Package (MILP).

7. METHODOLOGY

This study examines the effect of Multimedia Instructional Learning Package in biology teaching on 9th standard students' attitude towards biology learning. The research focused on 9th standard students from private school, Gurukula International School(GIS), Godlumuddenahalli, Vijayapura Hobli, Devanahalli Taluk, Bangalore Rural District. A sample of 40 students was divided into two groups: an experimental group receiving teaching instruction of Biology through Multimedia Instructional Learning Package (N=20) and a control group receiving instruction through traditional method(N=20). The intervention included animations, video, simulations, interactive activities, PowerPoint presentations along with user-friendly digital platforms like CDS, Pen drives. A Randomized Matching Control Group Pre-test Post-Test design was employed with 40 subjects, out of total subjects. The Attitude towards Biology Learning Scale, developed by the researcher, measured students' attitude through 60 items rated on a Likert scale from 5 (Strongly Agree) to 1 (strongly disagree). The scale's reliability was confirmed through Split Half Method and Test-Retest method. Paired 't' test was conducted for inferential analysis. The results were obtained with the help of SPSS Package and MS Excel, the level of significance was fixed at 0.05 and 0.01 levels.

8. ANALYSIS OF DATA

The collected data were analyzed using a paired t-test to determine the effect of Multimedia Instructional Learning Package (MILP) on 9th standard students' attitude towards Biology learning. The findings from both the control group (CG), which was taught using traditional method and the experimental group (MILP), which received multimedia-based instruction are interpreted as follows:

Objective-1: To study the effect of traditional teaching method on 9th standard students' attitude towards biology learning, as measured by the scores of ASTBL Scale developed by the researcher.

Hypothesis-1: There is no significant difference in the scores of attitude towards biology learning of 9th standard students in the Control Group between the pre-test and post-test who learned through the traditional method.

Table-1: Comparison of Mean Scores of Pre-test and Post-test on Students' Attitude towards Biology Learning in the Control Group.

Test	Control Group (Traditional Method)					
	Mean	**Standard Deviation**	**Obtained 't' Value**	**df**	**Table Value**	**Results**
Pre Test	243.550	34.458	0.70 (P=0.495)	19	2.09 @ 0.05 level	Not Significant
Post Test	246.200	30.283				

Table-1 presents a comparison of the pre-test and post-test mean scores of students in the control group (CG) who were taught Biology using the traditional method. The mean score in the pre-test was 243.550 with a standard deviation of 34.458, while the post-test mean score slightly increased to 246.200 with a standard deviation of 30.283. The obtained t-value was 0.70 (P=0.495), which is not significant at the 0.05 level (Table value = 2.09, df = 19). This result suggests that, there was no significant improvement in students' attitude towards Biology learning after instructing through the traditional teaching method. The minimal increase in mean scores indicates that, traditional instructional approaches had little or no impact on shaping students' perceptions of Biology learning.

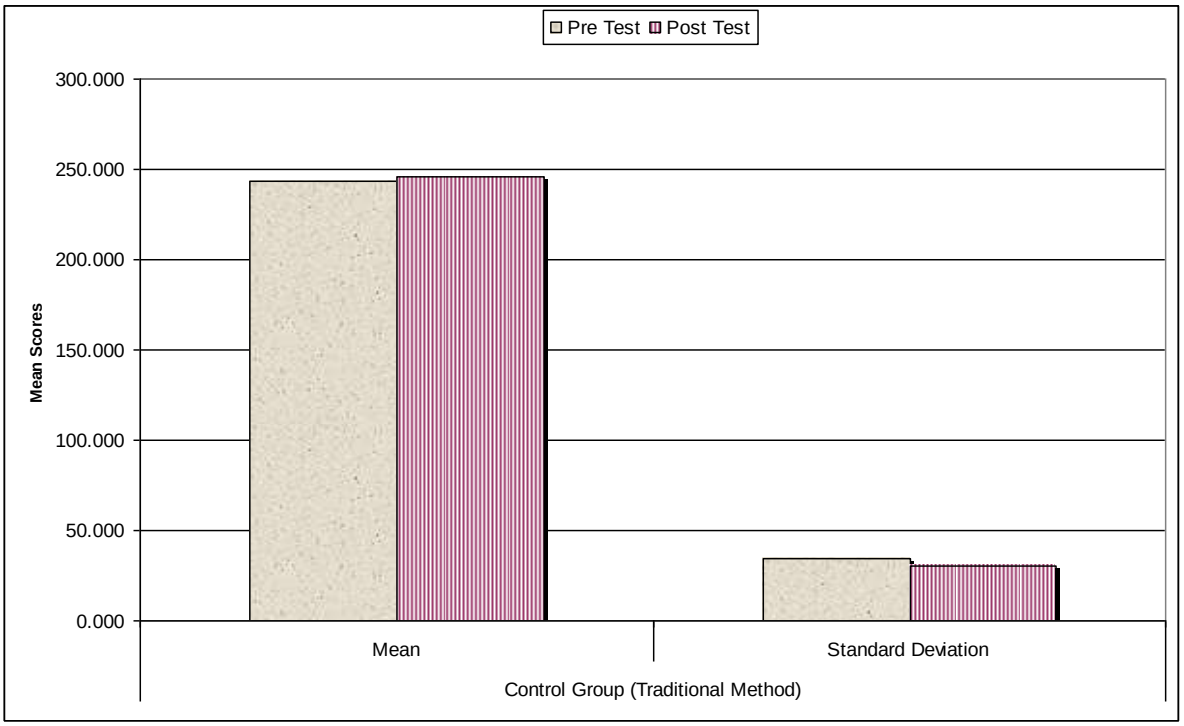

Fig.1: Graph showing the comparison of Mean Scores of pre-test and post-test on 9th standard students' scores of attitude towards biology learning in the Control Group (traditional method).

Objective-2: To study the effect of the Multimedia Instructional Learning Packages (MILP) on 9th standard students' attitude toward biology learning, as measured by the scores of the ASTBL Scale developed by the researcher.

Hypothesis-2: There is no significant difference in the scores of attitude towards biology learning of 9th standard students in the Experimental Group between the pre-test and post-test who learned through the Multimedia Instructional Learning Package (MILP).

Table-2: Comparison of Mean Scores of pre-test and post-test on students' attitude towards biology learning in the experimental group (MILP Based Teaching Strategy)

Test	MILP Based Teaching Strategy Group					
	Mean	**Standard Deviation**	**Obtained 't' Value**	**df**	**Table Value**	**Results**
Pre Test	244.500	23.800	5.25 (P=0.000)	19	2.86 @ 0.01 level	Significant at 0.01 level
Post Test	262.950	23.419				

Table-2 shows the results of the pre-test and post-test mean scores of students in the experimental group (MILP), who were taught using MILP teaching strategy. The pre-test mean score was 244.500 with a standard deviation of 23.800, whereas the post-test mean score significantly increased to 262.950 with a standard deviation of 23.419. The obtained t-value was 5.25 (P=0.000), which is significant at the 0.01 level (Table value = 2.86, df = 19).

The significant difference between the pre-test and post-test scores suggests that, the use of multimedia instructional strategies had a positive impact on students' attitude towards Biology learning. The increase in mean scores indicates that, students found the multimedia-based approach more engaging, interactive and effective in fostering interest and positive attitudes toward the subject.

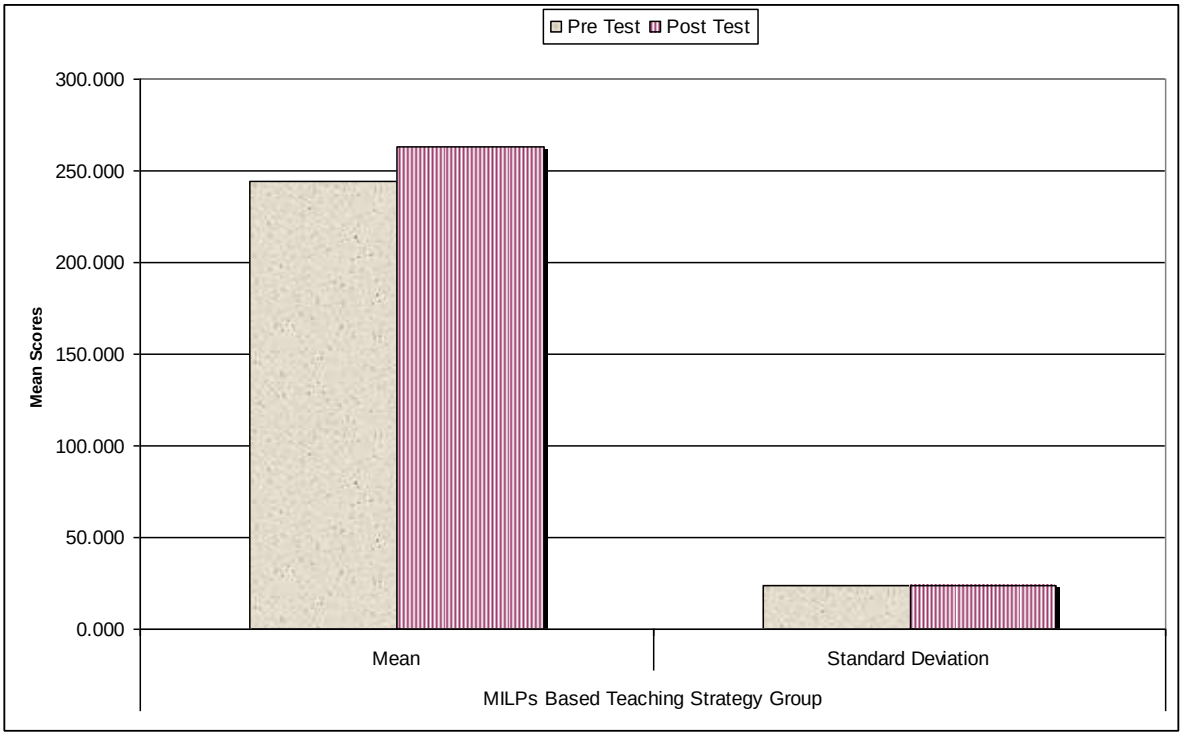

Fig.2: Graph showing the comparison of Mean Scores of pre-test and post-test on 9th standard students' attitude towards biology learning in the MILP Group (MILP based Teaching Strategy).

9. MAJOR FINDINGS

From the analysis of data, the following findings emerged:

1. The traditional teaching method may not have a substantial impact on the development of students' attitude towards biology learning.
2. The MILP-based teaching strategy has a positive and significant effect on the attitude development of 9th standard students.

10. DISCUSSION OF FINDINGS

The findings of this study highlight the significant impact of Multimedia Instructional Learning Package (MILP) on students' attitude towards Biology learning. The comparison between the control group (CG), which was taught using the traditional method and the experimental group (MILP), which received multimedia-based instruction, revealed important insights. The traditional

teaching approach did not result in a statistically significant improvement in students' attitude towards Biology. These findings align with previous studies (e.g., Musa et al., 2023; Mahawar & Bansal, 2022) that highlight the limitations of conventional teaching methods in enhancing students' engagement and attitudes toward science subjects.

In contrast, the experimental group that received MILP-based instruction showed a statistically significant improvement in their attitude towards Biology learning. The increase in post-test scores indicates that, multimedia learning tools made the subject more engaging, interactive and comprehensible for students. These results are consistent with the findings of Akinbadewa & Sofowora (2020) and Vebrianto & Osman (2011), who reported that multimedia instructional methods significantly enhance students' engagement and motivation in science learning. The ability of multimedia instruction to integrate visual and auditory elements likely contributed to this improvement by making abstract Biology concepts more tangible and relatable for students.

11. CONCLUSION

The comparative analysis of both the groups demonstrate that, while the traditional teaching method did not lead to a significant improvement in students' attitude towards Biology learning, the Multimedia Instructional Learning Package (MILP) resulted in a substantial positive change. The results emphasize the effectiveness of multimedia-based strategies in making Biology learning more engaging and appealing to students. This finding aligns with existing literature that highlights the potential of technology-enhanced learning to improve students' perceptions and overall academic experiences in science education. Therefore, it is recommended that, educators incorporate multimedia instructional tools in Biology teaching to foster a more positive learning environment and enhance students' interest in the subject.

12. EDUCATIONAL IMPLICATIONS

- The results of this study have several implications for educators, curriculum designers and policymakers in science education.
- Firstly, the significant improvement in students' attitudes toward Biology in the MILP group highlights the need for incorporating multimedia-based instructional strategies in secondary school science curricula and traditional methods alone may not be sufficient to foster students' enthusiasm for learning Biology, whereas multimedia instruction provides an interactive and student-centered approach that enhances engagement.
- Secondly, teachers need to be trained in integrating multimedia tools effectively into their teaching practices.
- Professional development programmes should emphasize how to design and implement digital resources, including simulations, animations and interactive modules, to maximize student learning outcomes.
- Furthermore, the policymakers should consider revising Biology curricula to include multimedia-enhanced instructional strategies.
- This would ensure that students benefit from modern pedagogical techniques that cater to diverse learning styles.
- Schools should also be equipped with the necessary technological infrastructure to support multimedia learning environments, ensuring equal access to high-quality science education.

13. SUGGESTIONS FOR FUTURE RESEARCH AND PRACTICE

Based on the study's findings, several recommendations can be made for future research and educational practice:

- Future research could explore the effectiveness of multimedia instructional strategies in other science disciplines, such as Physics and Chemistry, to determine whether similar positive effects can be observed.
- More emphasis should be placed on training teachers to effectively utilize multimedia tools in their instructional practices. Research investigates the challenges that the educators face in implementing multimedia instruction and provide solutions to address these barriers.

- Researchers and policymakers should focus on ensuring that, all students, regardless of socio-economic background, have access to digital learning resources to prevent disparities in science education.

By implementing these recommendations, educators and researchers further enhances the effectiveness of multimedia instructional strategies, ultimately improving students' attitude, engagement and academic success in science education.

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