



Employing Biocomics to Enhance Achievement in Biology among Viii Standard Students

Mary Chanchal C R

B.Ed Student, Peet Memorial Training College, Mavelikara, Kerala,

crmarychanchal@gmail.com

Dr. Sony Mary Varghese

Associate Professor, Peet Memorial Training College, Mavelikara, Kerala

akshayasony76@gmail.com

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ABSTRACT

This study, titled “Employing Biocomics to Enhance Achievement in Biology among VIII Standard Students,” investigates the effectiveness of biocomics as an innovative instructional strategy in improving students' academic achievement in biology. The study adopted a quasi-experimental pre-test–post-test design to assess the impact of the intervention. The investigator selected 32 students from VIII Standard of a secondary school through a simple random sampling technique. The intervention involved teaching selected biology concepts using specially designed biocomics that integrated scientific content with visual narratives and sequential illustrations to facilitate meaningful learning. Students' academic achievement was measured using a self-developed Biology Achievement Test administered before and after the intervention. Statistical analysis of the data revealed a significant improvement in the post-test scores, indicating that the use of biocomics positively influenced students' achievement in biology. The study also examined gender differences in academic achievement and found no

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significant difference between boys and girls. The findings suggest that biocomics are an effective, engaging, and learner-centred pedagogical tool that enhances conceptual understanding, promotes student interest, and improves academic achievement in biology among VIII Standard students.

INTRODUCTION

The study employing biocomics to enhance achievement in biology among VIII standard students aims to examine the effectiveness of employing biocomics as an to enhance achievement in biology among VIII standard students. Biology, as a core science subject at the upper primary and secondary levels, involves abstract concepts, complex processes, and scientific terminology that often pose learning difficulties for students when taught through traditional methods. These challenges may result in reduced interest, superficial understanding, and lower academic performance.

In recent years, innovative pedagogical approaches that integrate visual and narrative elements into classroom instruction have gained prominence for improving student engagement and learning outcomes. Biocomics are designed specifically to convey biological concepts through illustrations and dialogues to offer a learner-friendly medium that simplifies complex ideas, stimulates curiosity, and promotes conceptual clarity. By combining visual representation with storytelling, biocomics appeal to diverse learning styles and support meaningful learning.

This study treats biocomics as the independent variable and achievement in biology as the dependent variable. It seeks to assess whether exposure to biocomics can significantly improve students' understanding and retention of selected biology topics prescribed in the Class VIII syllabus. The findings of the study are expected to contribute to the growing body of research on innovative science teaching strategies and provide practical insights for biology teachers seeking to adopt creative instructional tools in the classroom.

NEED AND SIGNIFICANCE OF THE STUDY

Biocomics combine visual storytelling with scientific content to make biology learning more engaging and effective. During practice teaching, it was observed that many students struggled to understand and remember abstract biological concepts using conventional methods. This highlighted the need for a more interactive and visually supported teaching strategy.



Research indicates that combining text with visuals improves comprehension, retention, and student engagement (Mayer, 2009; Hosler & Boomer, 2011). Studies have also shown that educational comics enhance students' achievement, motivation, and understanding in science (Khalid & Azeem, 2012; Farrokhnia & Esmailpour, 2021). By presenting biological concepts through illustrations, dialogues, and sequential panels, biocomics simplify complex ideas, promote active learning, and improve long-term retention.

In the light of classroom experiences and the strong research evidence supporting visual narrative learning, the investigator considered it appropriate to apply biocomics in teaching biology among secondary school students. The investigator hopes that this approach will make biological concepts more understandable, engaging and memorable, thereby improving students academic achievement and overall experience.

STATEMENT OF THE PROBLEM

The problem entitled for the study is “Employing Biocomics to Enhance Achievement in Biology among VIII standard Students.”

OBJECTIVES OF THE STUDY

Following objectives were stated for the study

- To prepare lesson transcripts based on biocomics to enhance achievement in biology among VIII standard students.
- To compare the means of pre-test and post-test scores on achievement in biology among VIII standard students.
- To compare post-test mean scores on achievement in biology with respect to gender.
- To find out the percentage of students belonging to different levels of achievement in the post-test

HYPOTHESIS FOR THE STUDY

The following null hypotheses were formulated for the study:

- There is no significant difference between the means of pre-test and post-test scores on achievement in biology of VIII standard students



- There is no significance difference in the post-test mean scores on achievement in biology of VIII standard students with respect to gender

METHOD ADOPTED FOR THE STUDY

The investigator adopted an experimental method to examine the effectiveness of lesson transcripts based on biocomics to enhance achievement in biology among VIII standard students.

VARIABLES OF THE STUDY

The study has two variables i.e. Biocomics and Achievement in biology. In the present study, Biocomics is treated as the dependent variable, while Achievement in biology is considered the independent variable.

TOOLS AND MATERIALS USED FOR THE STUDY

Lesson transcripts on Biocomics

The invigilator prepared structured lesson transcripts, incorporating biocomics that illustrated key biological concepts. These lesson transcripts served as the primary instructional material for the intervention. The biocomics were designed to simplify complex topics, enhance visual learning, and increase student engagement during the classroom sessions. Lesson transcripts were prepared based on topics that students often get confused is selected from the biology textbook of VIII standard. Key concept like plastids, taxonomy, ecological interaction, trophic levels, five kingdom classification were chosen for developing biocomics as instructional material. The lesson transcripts were designed following the 5E Learning Model, which includes Engage, Explore, Explain, Elaborate, and Evaluate phases to ensure an interactive and structured learning process.

Achievement test in Biology

An Achievement test constructed by the investigator was used to assess students understanding on the concepts in biology based on which the biocomics was prepared. The test consisted of objective type questions, short-answer questions, and essay type questions aligned with the content delivered through biocomics. It was administered both as a pre-test and post-test to determine the effectiveness of the biocomics. The tool aimed to measure the achievement of VIII standard students in the above topics before and after teaching through biocomics.

ANALYSIS AND INTERPRETATION OF DATA

The investigator collected data from the experimental group before and after the lesson transaction, which was conducted using biocomics in biology. The data were analyzed and interpreted to determine the effectiveness of lesson transcripts based on the biology chapter in enhancing students' achievement.

COMPARISON OF MEANS OF PRE -TEST AND POST TEST SCORES ON ACHIEVEMENT IN BIOLOGY WITH RESPECT TO TOTAL SAMPLE

The investigator conducted a pre-test to assess the level of achievement in biology among a selected sample of 32 VIII standard students. Following the pre-test, the investigator taught biology through biocomics. After the intervention, a post-test was administered to assess the level of achievement in biology among the same sample. The investigator then compared the pre-test and post-test mean scores on achievement in biology to evaluate the effectiveness of biocomics. The scores from both tests were statistically analysed. Initially descriptive statistics like arithmetic mean and standard deviation were calculated. These values were further subjected to a test of significance of difference between means to determine whether there is a significant difference between the pre-test and post- test means scores on achievement in biology. The data and results of the test of significance of difference between means are presented in the table below.

Table 1: Data and results of test of significance of difference between the means of pre-test and post-test scores on achievement in biology.

Test	Number of students	Mean	Standard deviation	t-value	Level of significance
Pre-test	32	15.78	2.21	10.77	Significant at 0.05 level
Post-test	32	21.28	1.86		

t table value at 0.05 level for df 31 is 1.697

Table 1 shows a significant difference between the pre-test ($M = 15.78$) and post-test ($M = 21.28$) scores, with a mean difference of 7.61. The calculated t-value of 10.51 exceeds the critical value of 1.697 at the 0.05 significance level ($df = 31$), leading to the rejection of the null hypothesis. This confirms that biocomics significantly improved biology achievement among Class VIII students.

COMPARISON OF MEANS OF POST-TEST SCORES ON ACHIEVEMENT IN BIOLOGY WITH RESPECT TO GENDER.

After the administration of the post-test the investigator attempted to compare the means of scores on post achievement test with respect to gender. Among 32 students, 12 were girls and 20 were boys. The post-test mean scores on achievement in biology of boys and girls were subjected to statistical analysis and the mean and standard deviation were found. The mean and standard deviation of the post test scores were subjected to the test of significance of difference between means. The data and results of the test of significance of difference between the means is given in the table below.

Table 2: Data and results of test of significance of difference between post-test mean scores on achievement with respect to gender.

Gender	Number of students	Mean	Standard deviation	t-value	Level of significance
Boys	20	21	2.17	1.7	Significant at 0.05 level
Girls	12	21.9	0.58		

t table value at 0.05 level for df 31 is 1.697

The t value obtained by comparing the mean scores on achievement in biology with respect to gender is 1.7 which is slightly greater than the t- table value at 0.05 level($t=1.697$), which means that the obtained t value is significant. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted. That is there is a significant difference between the post-test mean scores on achievement in biology with respect to gender.

PERCENTAGE OF STUDENTS BELONGING TO DIFFERENT LEVELS ON ACHIEVEMENT IN THE POST TEST.

The study attempted to find out the percentage of students belonging to different levels of achievement with respect to their post test scores in achievement in biology. The maximum score in the achievement test is 25. The mean and standard deviation of the post test scores on achievement in biology are calculated to find out the percentage of students belonging to different levels of achievement in biology.

Table 3: Descriptive statistical measures of the post-test scores on achievement in biology.

Statistical measure	Value
Mean	21.28
Standard deviation	1.86



The arithmetic mean (μ) of the post-test scores on achievement in biology is 21.28 and standard deviation (σ) is 1.86. Therefore $\mu + \sigma = 23.14$ and $\mu - \sigma = 19.42$. Out of 32 students, 2 of them scored above 23.14, and can be categorised as above average students. 5 students scored below 19.42 and can be categorised as below average students and 25 students who scored between 23.14 and 19.42 can be categorised as average students. This result is indicated clearly in the figure given below.

Table 4: Percentage of students belonging to different levels of achievement in biology in the post-test.

Level	Number of students	Percentage
Above average	2	6.25
Average	25	78.12
Below average	5	15.62

The table 5.4 shows that 6.25% of students are above average, 15.62 % of students are below average and 78.12% of students are average with respect to their post-test scores on achievement in biology.

MAJOR FINDINGS OF THE STUDY

- There is a significant difference between the means of pre-test and post-test scores on achievement in biology of VIII standard students
- Biocomics is effective in enhancing the achievement in biology of VIII standard students
- There is significant difference in the post-test mean scores on achievement in biology with respect to gender.
- About that 6.25% of students are above average, 15.62 % of students are below average and 78.12% of students are average in the post test on achievement in biology.

The analysis of the data revealed a significant difference between the mean pre-test and post-test achievement scores of VIII standard students in Biology. This indicates that the lesson transcripts based on biocomics were effective in enhancing students' achievement in Biology. A significant difference was also observed in the post-test achievement scores with respect to gender.

Further analysis of the post-test scores showed that, out of the 32 students, 2 students (6.25%) were categorised as above average, 25 students (78.12%) as average, and 5 students (15.62%) as below average. The lower performance of some students may be attributed to inadequate conceptual understanding of Biology concepts and insufficient revision. In addition, teachers often find it difficult to provide individual attention to every learner due to the large number of students in the classroom.

The findings of the present study are consistent with previous research, which has demonstrated that the use of biocomics as an instructional strategy makes Biology learning more engaging and effective. Earlier studies have reported that biocomics improve students' academic achievement, strengthen conceptual understanding, and enhance knowledge retention. Therefore, the results of the present study support the conclusion that biocomics serve as an effective pedagogical tool for improving achievement in Biology among VIII standard students

CONCLUSION

The study reveals that biocomics is highly effective in enhancing achievement in biology among VIII standard students. Research suggests that integrating comics into instruction enhances engagement, understanding, and retention of biological concepts. Traditional textbook-based methods often fail to capture students' interest or make abstract ideas accessible. Biocomics provide visual storytelling and simplified illustrations, helping students relate to complex processes. This approach encourages curiosity, reinforces conceptual clarity, and promotes long-term memory retention. Therefore, biocomics significantly enhance students' learning outcomes in biology by making concepts more visual, engaging, and easier to comprehend.

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