Original Article

GRT JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY

A Bi-Annual Journal A Peer Reviewed Online and Open Access Journal

Published by GRT College of Education ISSN: 2584-301X

Effectiveness of E-Content in Teaching Zoology among Higher Secondary Students in relation to Achievement

V. Shobana Devi*[1] and P. Ganesan[2]

[1]Ph.D., Research Scholar, Department of Pedagogical Sciences, Tamil Nadu Teachers Education University, Karappakkam, Chennai-97.

[2]COE (i/c) and Dean of Faculty Department of Pedagogical Sciences, Tamil Nadu Teachers Education University, Karappakkam, Chennai-97.

Article History:

Received on: 15 Feb 2025
Revised on: 05 Apr 2025
Accepted on: 13 May 2025

Keywords:

E-content,
Achievement,
Zoology,
Higher Secondary Student.

Abstract

This study investigates the effectiveness of e-content teaching in zoology among higher secondary students with respect to their academic achievement. Using a quasi-experimental pretest-posttest nonequivalent control group design, 60 students were divided into an experimental group taught using digital learning materials such as animations, videos, and interactive simulations, and a control group taught through traditional methods. Pre-test results showed no significant difference between the groups, confirming similar baseline knowledge. However, post-test scores revealed a significant improvement in the experimental group compared to the control group, indicating that e-content teaching positively influenced students' understanding and retention of zoological concepts. The findings suggest that integrating e-content enhances engagement and academic performance in science education. Recommendations include teacher training, curriculum integration of digital content, and increased access to technology in schools. The study provides evidence supporting the use of e-content as an effective teaching strategy to improve learning outcomes in zoology at the higher secondary level.

*Corresponding Author
Name: V. Shobana Devi
Phone: +91 7708745339
Email: shobanadevi85@gmail.com

Journal Home Page: www.grtjest.com
https://doi.org/10.26452/grtjest.v3i1.70

Production and hosted by
GRT College of Education

INTRODUCTION

In recent times, the field of education has experienced major changes due to the rapid growth of technology. The use of electronic content, which includes digital learning materials such as videos, animations, simulations, and interactive quizzes, is becoming more common in schools around the world. Science subjects like zoology, which deal with complex ideas and biological processes, often benefit from the use of digital tools that help make learning more engaging and understandable. At the higher secondary level, many students find it difficult to understand detailed zoological topics when taught through traditional classroom methods. Teaching with electronic content provides visual and interactive formats that support different learning styles. This can help students understand and remember the material better, which may lead to improved academic performance. As technology continues to be part of the learning process, it is important to examine how effective these methods really are in helping students achieve better results. In this background, the present study focuses on exploring the effectiveness of teaching zoology using electronic content among higher secondary students. It aims to understand how such digital methods affect students' academic achievement. The findings of this study may help teachers, curriculum planners, and education experts improve teaching methods in zoology and other science subjects.

STATEMENTOFTHEPROBLEM

Teaching zoology at the higher secondary level often relies on traditional methods such as lectures and textbooks. These methods may not always be effective in helping students understand complex biological concepts. Many students struggle with remembering and applying what they learn, which can lead to lower academic performance. With the growth of digital technology, electronic content has started to play a larger role in education. Materials such as animations, videos, and interactive lessons are being used to support classroom teaching. These tools have the potential to make learning more interesting and easier to understand. However, the actual impact of electronic content on student achievement in zoology needs to be studied carefully.

There is a need to find out how well these digital resources work in improving learning outcomes. This study aims to identify the role of electronic content in helping students perform better in zoology and to provide useful suggestions for improving teaching strategies at the higher secondary level "Effectiveness of E-content Teaching in Zoology Among Higher Secondary Students in Relation to Achievement".

DEFINITION OF TERMS

E-content

Refers to digital learning materials such as videos, animations, presentations, simulations, and online quizzes that are used to support the teaching and learning process.

Zoology

A branch of biology that deals with the study of animals, including their structure, function, development, classification, and behavior.

Higher Secondary Students

Students studying in classes 11 and 12, usually between the ages of 16 and 18, in a school system before entering college or university.

Achievement

The academic performance of students as measured by test scores, grades, or other assessment tools, especially in the subject of zoology in this study.

Effectiveness

The degree to which a teaching method, such as the use of e-content, helps students understand the subject and perform better in assessments.

Traditional Teaching Method

A method of instruction mainly based on textbooks, classroom lectures, and written notes without the use of digital tools.

DESIGNOFTHE STUDY

The study is quasi-experimental in nature where in a pretest-posttest nonequivalent groups design was employed. The pretest-posttest nonequivalent groups design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes, which may be similar (Best &Kahn, 2006). Quasi-experimental designs are "almost" true experimental designs except that the participants are not randomly assigned to groups (Mertens,1998). In this research, the investigator had selected based on IQ test score the group dived into two groups assigning participants to the experimental or control groups. Best and Kahn (2006) observed that if the quasi-experimental design is the only feasible one, the comparison is justifiable. As mentioned, the study adopted a pretest-post test non-equivalent groups design. Pretests on achievement in Zoology Education achievement were administered to both the experimental and control group. Then, the experimental group was taught using E-content teaching strategies, whereas the control group was taught by the regular teacher using the conventional teaching method. Then posttests were administered to both the groups. The design is symbolically represented and outlined in the following table.

Q1	X	Q2
Q3	C	Q4

Where Q

Q1 and Q2= Pre-tests and Post-test Q3 and O4=Pre-test and Post-tests X= Experimental treatment = Conventional teaching

Null Hypothesis: 02

There is no significant difference between the control and experimental group Higher secondary students in their pre-test scores of achievement in Zoology

Table 1 Significant difference between the control and experimental group Higher secondary students in their pre-test scores of achievement in Zoology

Group	N	Mean	SD	't' value	df	Remark
Pre-test score of Control Group	30	11.50	1.17	0.705	58	NS
Pre-test score of Experimental Group	30	12.77	1.68			

(At the 0.01 level of significance the table value of "t" is 2.576)

Table 2 Significant difference between the control and experimental group Higher secondary students in their post-test scores of achievement in Zoology

Group	N	Mean	SD	't'value	df	Remark
Post-test score of Control Group	30	21.34	2.01	16.33	58	S
Post-test score of Experimental Group	30	27.50	1.04			

(At 0.01 level of significance the table value of t is 2.576)

The above **Table 1** shows that, control and experimental group mean scores value are

11.50 and 12.77 respectively with a standard deviation of 1.17 and 1.68 respectively. The calculated" value (t=0.705) is lesser than the critical values of 2.576 at 0.01 level of significance with df=58. Hence, the null hypothesis is "There is no significant difference between the control and experimental group Higher secondary students in their pre-test scores of achievement in Zoology" is accepted and concluded.

Null Hypothesis: 02

There is no significant difference between the control and experimental group higher secondary students in their post-test scores of achievement in Zoology

The above **Table 2** shows that, control and experimental group mean scores value is

21.34 and 27.50 respectively with a standard deviation of 2.01 and 1.04 respectively. The experimental group mean scores (M=27.50) are higher than the control group mean scores (M=21.34). The calculated "value (t=16.33) is greater than the critical values of 2.576 at 0.01 level of significance with df=58. Hence, the null hypothesis" There is no significant difference between the control and experimental group Higher secondary students in their post-test scores of achievement in Zoology" is rejected and concluded that there is significant difference between the control and experimental group Higher secondary students with reference to their Post-test scores of achievement in Zoology Therefore, E-content teaching was found effective during intervention.

FINDING OF THE STUDY

The analysis of the data using the t-test reveals important findings about the academic achievement of higher secondary students in zoology. The findings from the statistical analysis reveal key insights into the effect of e-content teaching on the academic achievement of higher secondary students in zoology. In the pre-test scores, the control group had a mean of 11.50 with a standard deviation of 1.17, while the experimental group had a slightly higher mean of 12.77 with a standard deviation of 1.68. The calculated t-value was 0.705, which is less than the critical value of 2.576 at the 0.01 level of significance with 58 degrees of freedom. This result indicates that there is no statistically significant difference between the control and experimental groups before the intervention. Therefore, the null hypothesis stating that there is no significant difference in pre-test scores is accepted. This confirms that both groups started at a nearly equal level of understanding in zoology.

However, in the post-test, the mean score of the experimental group increased to 27.50, while the control group achieved a mean of 21.34. The standard deviations were 1.04 for the experimental group and 2.01 for the control group. The calculated t-value for the post-test was 16.33, which is significantly higher than the table value of 2.576 at the 0.01 level of significance. This result shows a statistically significant difference in the post-test achievement scores between the two groups. As a result, the null hypothesis is rejected.

This significant improvement in the performance of the experimental group suggests that the use of e-content was effective in enhancing students' learning outcomes. The digital teaching materials, such as animations, interactive simulations, and visual presentations, likely contributed to better understanding, increased interest, and improved retention of zoological concepts. Hence, it can be concluded that e-content

teaching had a positive and measurable impact on student achievement in zoology at the higher secondary level.

INTERPRETATION FOR THE STUDY

The results of the study show that the use of e-content teaching had a clear and positive effect on students' performance in zoology. While both groups had similar performance levels in the pre-test, the group that was taught using digital materials such as animations, videos, and interactive tools showed much better results in the post-test. This improvement suggests that e-content helped students understand difficult concepts more easily. The use of visual and interactive tools may have increased student interest, improved attention, and helped them remember information more effectively. As a result, students in the experimental group performed better than those taught through traditional methods. Based on these findings, it can be concluded that e-content is an effective teaching method for improving academic achievement in zoology among higher secondary students.

RECOMMENDATIONS FOR THE STUDY

Schools should promote the regular use of e-content in science classrooms.

Teachers should receive proper training and attend workshops to use digital tools effectively.

Curriculum planners should integrate e-content into the school syllabus.

Government and school authorities should allocate funds for smart classroom tools and internet access.

Educational software and learning platforms should be made available to students for home use.

Student evaluation methods should include assessments based on digital learning tools.

Schools should develop e-libraries with zoology-related videos and simulations.

Parents should be encouraged to support and guide students in using digital content at home.

Textbooks should include QR codes that link to related e-content resources.

Peer learning activities using digital tools should be encouraged in the classroom.

E-content materials should be based on research and aligned with the local curriculum.

School administrators should regularly monitor the use and impact of e-content teaching.

Awareness programs should be conducted to inform students, parents, and teachers about the benefits of digital learning.

SUGGESTIONS FOR FURTHER STUDY

Future research should investigate the use of e-content in other science subjects like botany, chemistry, and physics.

Studies should explore the long-term effects of e-content on student knowledge retention.

Researchers should analyze how student motivation and interest are influenced by digital tools.

Comparative studies between urban and rural schools can reveal differences in digital resource access.

The impact of e-content on students with varied learning abilities should be studied.

The effectiveness of different digital formats such as videos, simulations, and games should be compared.

E-content should be developed in regional languages to improve understanding for all learners.

Cost-benefit analysis of large-scale implementation of e-content should be conducted.

The role of parents in supporting e-learning at home needs further exploration.

Teacher and student feedback should be collected to improve the design of e-content materials.

More experimental research with large and diverse student samples should be carried out.

Future studies should evaluate how e-content influences skills such as critical thinking and problem-solving.

CONCLUSION

The study concludes that e-content teaching is more effective than traditional methods in improving academic achievement in zoology among higher secondary students. While both groups started with similar knowledge levels, the experimental group showed greater improvement after the use of digital materials. E-content made complex topics easier to understand and more engaging for students. The visual and interactive nature of digital tools contributed to better learning outcomes. The study supports the integration of technology in education to enhance teaching and learning. It highlights the need for training, infrastructure, and curriculum support to implement e-content successfully.

The findings confirm that modern teaching methods can make science more accessible and enjoyable. This research provides a strong foundation for using digital tools in the classroom. By adopting e-content, schools can improve both student understanding and academic performance. Overall, the study encourages the widespread use of technology to modernize science education and support learner achievement.

Ethical Approval

No ethical approval was necessary for this study.

Author Contribution

All authors made substantial contributions to the conception, design, acquisition, analysis, or interpretation of data for the work. They were involved in drafting the manuscript or revising it critically for important intellectual content. All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring its accuracy and integrity.

Funding Support: The Author declares that there is no funding.

Conflict of Interest: The Author declares that there is no conflict of interest.

REFERENCES

[1] Aggarwal, J.C. (2019). Essentials of Educational Technology: Teaching Learning Innovations in Education (3rd ed.). Vikas Publishing House.

[2] Mayer, R.E. (2021). Multimedia Learning (3rd ed.). Cambridge University Press. https://doi.org/10.1017/9781108788045

[3] Reddy, R.S. (2018). Educational Technology: Effective Teaching and Learning. APH Publishing.

[4] Sharma, R.A. (2017). Instructional Technology and Curriculum Development. R. Lall Book Depot.

[5] Singh, Y.K. (2020). Research Methodology and Statistics. New Age International Publishers.

[6] Yadav, A.K., & Yadav, M.S. (2021). Effect of digital content on student learning achievement in science. International Journal of Education

and Psychological Research, 10(2), 34–40.

[7] Zhou, M., & Brown, D. (2015). Educational Learning Theories (2nd ed.). Education Open Textbooks. https://oer.galileo.usg.edu/education-textbooks/1.

GRT JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY