

**A STUDY ON EFFECTIVENESS OF GAME BASED LEARNING
ON REFLECTIVE THINKING OF MIDDLE STAGE STUDENTS IN
BIOLOGY**

DISSERTATION SUBMITTED TO
BARKATULLAH UNIVERSITY, BHOPAL

In partial fulfillment of the requirement for the degree of
Three-Year Integrated B.Ed. M.Ed. Program

Session: 2022-2025

SUPERVISOR

Dr. Manju
Associate Professor
Department of Education
Regional Institute of Education,
Bhopal, Madhya Pradesh

D-737

RESEARCH SCHOLAR

Akankshya Sunani
B.Ed.M.Ed. (Integrated)
Semester-VI
Roll No.: 2306600303
RIE, Bhopal, Madhya Pradesh



DEPARTMENT OF EDUCATION
REGIONAL INSTITUTE OF EDUCATION
(National Council of Educational Research and Training)
NAAC Accredited A⁺⁺ Grade Institute
Bhopal 462002, Madhya Pradesh

DECLARATION

I, **Akankshya Sunani**, hereby declare that the dissertation entitled **A STUDY ON EFFECTIVENESS OF GAME BASED LEARNING ON REFLECTIVE THINKING OF MIDDLE STAGE STUDENTS IN BIOLOGY** has been carried out by me during the academic year 2022-25 in partial fulfillment of the requirement for the degree of Three- year Integrated B.Ed. M.Ed. Program from Barkatullah University, Bhopal.

The study has been conducted under the supervision and guidance of Dr. Manju, Associate Professor, Department of Education, Regional Institute of Education, Bhopal, Madhya Pradesh.

It is also declared that the research work done by me is original to the best of my knowledge. This dissertation has not been submitted by me for award of any other degree or diploma in Barkatullah University, Bhopal or any other University.

Place: RIE, Bhopal

Date:

Akankshya Sunani

B.Ed. M.Ed. (Integrated)

Semester-VI

Regional Institute of Education

Bhopal, Madhya Pradesh

CERTIFICATION

This is to certify that the dissertation entitled A STUDY ON EFFECTIVENESS OF GAME BASED LEARNING ON REFLECTIVE THINKING OF MIDDLE STAGE STUDENTS IN BIOLOGY being submitted by AKANKSHYA SUNANI, a student of B.Ed.M.Ed. (Integrated) Program bearing Roll Number 2306600303 and Enrollment Number R230664070002, Regional Institute of Education, NCERT, Bhopal, M.P., is a bonafide student and this research is carried by her in the Department of Education, RIE, under my supervision and guidance. The work is original to the best of her knowledge and it has not been submitted earlier in any form of degree at any university by her.

This is further certified that the dissertation in its present form is fit for the submission to Barkatullah University for the award of the degree of Three-year B.Ed. M.Ed. (Integrated) program.

Place: RIE, Bhopal

Date:

Dr. Manju

Associate Professor

Department of Education

Regional Institute of Education

Bhopal, Madhya Pradesh

ACKNOWLEDGEMENT

*First and foremost, I would like to express my deepest gratitude to my supervisor, **Dr. Manju**, Associate Professor, Regional Institute of Education (RIE), Bhopal, for her invaluable guidance, unwavering support, and insightful feedback throughout the course of this dissertation. Her mentorship has been instrumental in shaping my research and academic growth. I am profoundly thankful to **Professor S.K. Gupta**, Principal, RIE, Bhopal, for his encouragement and for providing a conducive academic environment that fostered my learning and research endeavors. I am equally grateful to **Professor Jaydip Mandal**, Dean of Instructions, RIE, Bhopal, for his leadership that promotes academic excellence.*

*My sincere thanks to **Professor Ayushman Goswami**, HoD, Department of Education, RIE, Bhopal, for his continuous support and for facilitating the resources necessary for the successful completion of this study. I also extend my heartfelt appreciation to **Professor D.N. Sansanwal**, for his guidance and support during the study. My sincere gratitude to **Dr. P.K. Tripathy**, Deputy Librarian, RIE, Bhopal, whose assistance in accessing and navigating scholarly assets significantly contributed to the depth and quality of my research. I would like to acknowledge **Mr. Sujit Roy**, Principal of Kendriya Vidyalaya, Sector-6, Rourkela, for his support and encouragement.*

Last but not the least, I am deeply grateful to my family and friends for their unwavering support, patience, and encouragement throughout this journey. Their belief in my abilities provided me with strength and motivation to persevere during challenging times.

Place: RIE, Bhopal

Date:

Akankshya Sunani

B.Ed. M.Ed. (Integrated)

Semester-VI

Regional Institute of Education

Bhopal, Madhya Pradesh

TABLE OF CONTENTS

Declaration	I
Certificate	II
Acknowledgement	III
List of Figures	VI
List of Tables	VIII
Abbreviations	IX

CHAPTER	TITLE	Page No.
CHAPTER- I	INTRODUCTION	1-22
	1.1 Background of the Study	3
	1.2 Historical background of Game Based Learning	4
	1.3 Government initiatives driving Game Based Learning in education	7
	1.4 Game Based Learning and Reflective Thinking	8
	1.5 NEP 2020 on Reflective skill enhancement through GBL at Middle stage	9
	1.6 NCF-SE 2023 and GBL	10
	1.7 Role of Biological Science as a reflective subject at Middle stage	11
	1.8 Recent transformation of Biology Teaching at Middle school education	12
	1.9 Impact of GBL integrated Biology Education	14
	1.10 Rationale of the Study	15
	1.11 Statement of the Problem	20
	1.12 Operational Definition of the Key Terms	20
	1.13 Objectives of the Study	21

	1.14 Hypothesis	22
	1.15 Delimitations of the Study	22
CHAPTER-II	REVIEW OF RELATED LITERATURE	23-35
CHAPTER-III	RESEARCH METHODOLOGY	36-40
	3.1 Design of the Study	36
	3.2 Conceptual Framework	36
	3.3 Variables	37
	3.4 Population and Sample	37
	3.5 Sampling Technique	37
	3.6 Sample size	38
	3.7 Research Tools	38
	3.8 Procedure of data collection and organization	39
	3.9 Statistical techniques used in the Study	40
CHAPTER-IV	DATA ANALYSIS AND INTERPRETATION	41-54
	4.1 Analysis of data using SPSS	41
	4.2 Hypothesis wise Analysis, Interpretation and Discussion of Result	45
	4.2.1 Hypothesis 1	45
	4.2.2 Hypothesis 2	46
	4.2.3 Hypothesis 3	47
	4.2.4 Hypothesis 4	48
	4.2.5 Hypothesis 5	49
	4.2.6 Hypothesis 6	53
	4.3 Analyzing perception towards GBL	54

CHAPTER-V	SUMMARY, DISCUSSION, CONCLUSION AND RECOMMENDATION	
	5.1 Summary of Major Findings of the Study	61
	5.2 Conclusions & Discussion	62
	5.3 Educational Implications of the findings of the Study	63
	5.3.1 Implications for Biology Teachers at the Middle stage school level	63
	5.3.2 Implications for School Administrators	65
	5.3.3 Implications for Policy Maker	66
	5.3.4 Implications for Parents	67
	5.4 Suggestions for further research	68
	BIBLIOGRAPHY	
	APPENDICES	

LIST OF FIGURES

Sl. No.	Content	Page No.
3.1	Schematic Diagram presenting the conceptual framework of this study	36
4.1	Histogram of Control Group Pre-Test Score Frequency	43
4.2	Histogram of Control Group Post-Test Score Frequency	43
4.3	Histogram of Experimental Group Pre-Test Score Frequency	44
4.4	Histogram of Experimental Group Post-Test Score Frequency	44
4.5	Bar graph showing mean academic achievement scores of pre-test and post-test within the control group	45
4.6	Bar graph showing mean academic achievement scores of pre-test and post-test within the experimental group	46
4.7	Bar graph showing significant difference between the post-test (BSAT-2) scores of the control and experimental group in the achievement test of Biology	48
4.8	Bar graph showing comparison of mean scores of Control group and Experimental group after lecture method and Game Based Learning respectively	52
4.9	Pie chart representing theme wise percentage contribution towards CARD-CONNECT REFLECT	56
4.10	Bar graph representing theme wise percentage contribution towards CARD-CONNECT REFLECT	56
4.11	Pie chart representing the top 5 perceptions towards CARD-CONNECT REFLECT	58
4.12	Pie chart representing the lowest 5 perceptions towards CARD-CONNECT REFLECT	60

LIST OF TABLES

Sl. No.	Content	Page No.
3.1	Presentation of the total collected sample size	38
4.1	Descriptive Statistics table showing range, mean, standard deviation, variance, skewness and kurtosis.	41
4.2	Frequency table showing mean, median, mode.	42
4.3	Paired sample t-test for control group with respect to pre-test and post-test	45
4.4	Paired sample t-test for experimental group with respect to pre-test and post-test	46
4.5	Independent samples t-test for control and experimental group in Post-test (BSAT-2).	47
4.6	Independent Samples t-test for control and experimental group in Post-test (BSAT-2).	48
4.7	Mean, mode and standard deviation of Control group	49
4.8	Mean, mode and standard deviation of Experimental group	50
4.9	Post-Intervention Item wise mean scores of Reflective Thinking level of Control group and Experimental group	51
4.10	Pearson correlation (r)	53
4.11	Theme wise mean scores along with contribution percentage	55
4.12	Items with Strong Perceptions towards CARD-CONNECT REFLECT	57
4.13	Items with Moderate Perceptions towards CARD-CONNECT REFLECT	58
4.14	Items with Lowest Perceptions towards CARD-CONNECT REFLECT	59

LIST OF ABBREVIATIONS

BSAT: Biological Science Achievement Test

CBSE: Central Board of Secondary Education

GBL: Game Based Learning

GBL-ET: GBL Engagement Tool

KV: Kendriya Vidyalaya

NCF-SE, 2023: National Curriculum Framework for School Education, 2023

NEP, 2020: National Education Policy, 2020

PT-GBL: Perception Towards GBL

RTIESS: Reflective Thinking Instrument for Elementary School Students

SPSS: Statistical Package for the Social Sciences