Educational Administration: Theory and Practice
2024,30(5) 15592-15598
ISSN:2148-2403
https://kuey.net/

Research Article

The Extent Of Utilization Of Online Puzzles For Learning Mathematics At Higher Secondary Level

Mrs. L. Jamuna Rani[1*], Dr. N. Ramakrishnan[2]

[1*]Research Scholar, Department of Educational Technology, Tamil Nadu Teachers Education University, Chennai.
[2]Professor, Former Member Syndicate, Tamil Nadu Teachers Education University, Chennai.

Citation: Mrs. L. Jamuna Rani, et.al (2024), The Extent Of Utilization Of Online Puzzles For Learning Mathematics At Higher Secondary Level, Educational Administration: Theory and Practice, 30(5), 15592-15598
Doi: 10.53555/kuey.v30i5.9961

ARTICLE INFO

ABSTRACT

This study investigates the extent of utilization of online puzzles in learning mathematics at higher secondary level. Online puzzles have become a potential resource for improving mathematics instruction as digital learning tools gain popularity. The purpose of this study is to investigate the extent to which online puzzles are utilized in math classes, how well they foster critical thinking and problem-solving abilities, and how they affect student motivation and engagement. The investigator ha s followed random sampling method for the present study. The investigator has collected a sample of 450 higher secondary students studying in Madurai. The study informs educators and policymakers about the potential of this creative method to boost student learning outcomes by shedding light on the advantages and difficulties of using online puzzles into mathematics teaching.

KEYWORDS: Online Puzzles, Mathematics Education, Higher Secondary Level, Educational Technology, learning Methods.

NEED FOR STUDY

Examining how often these resources are used for mathematics instruction at the upper secondary level is vital given the growing popularity of digital learning tools and the potential benefits of online puzzles in enhancing mathematics education. Despite its promise, little is known about the extent to which online puzzles are used in mathematics instruction, particularly in upper secondary schools. This study aims to investigate the use of online puzzles in mathematics education and the extent to which they promote critical thinking, logical reasoning, and problem-solving skills. By evaluating the efficacy and usage of online puzzles, this study can enhance student learning, support teacher professional development, and guide educational practice to improve mathematics education outcomes at the higher secondary level.

TERMS AND DEFINITION

Extent of Utilization : it measures how much, how often or how widely online puzzles are being used to support learning.
Online puzzles: it refers a game or problem solving activity that can be played digitally.

Learning: it refers the process of picking up new information, abilities, attitudes or behavior s by instruction, study or experience.
Mathematics: the abstract study of numbers quantities, forms and patterns as well as their interactions and characteristics is referred to us.
Higher Secondary Level: it usually includes the last year of secondary school, which depending on the national educational system, may include grade 11/12 or their equivalent.

OBJECTIVES OF THE STUDY

1. To find out the percentage of utilization of online puzzles for learning mathematics among students at higher secondary level.
2. To find out the extent of utilization of online puzzles for learning mathematics among students at higher secondary level.

HYPOTHESIS OF THE STUDY

1. The percentage of utilization of online puzzles for learning mathematics among students at higher secondary level is average.
2. The extent of utilization of online puzzles for learning mathematics among students at higher secondary level is average.

INSTRUMENTATION

The investigator developed and validated a rating scale on 'Utilization of online puzzles for learning mathematics at higher secondary level. The ratings were Fully, Partially and Not at all.

ESTABLISHING VALIDITY OF THE TOOL

The investigator has consulted assistant professors in the department of mathematics in Mannar Thirumalai Nayakkar College to check the content in the rating scale. The opinions of them were carried out in the tool. It ensures face and content validity of the inventory.

ESTABLISHING RELABILTY OF THE TOOL TEST – RETEST METHOD

The tool was administered among 50 higher secondary mathematics teachers. After a gap of two weeks, the tool was re-administered among the same 50 higher secondary mathematics teachers. Pearson's product moment correlation was applied to the scores. The correlation value out was 0.86. It is a high level of correlation. Thus, the reliability of the tool was ensured.

SCORING

The number of responses for each item is counted and percentage worked out. For each student's ranking was given frequency and counted.

SAMPLE DESIGN

The investigator has followed random sampling method for the present study. The investigator has collected a sample of 450 higher secondary students studying Madurai District.

ANALYSIS

HYPOTHSIS 1

The percentage of utilization of online puzzles for learning mathematics among students at higher secondary level is average.

TABLE 1 : PERCENTAGE ANALYSIS ON UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL

S.No	Online Puzzles	Fully	Partially	Not at all
1	Math Riddles	68.7% (309)	27.3% (123)	4% (18)
2	Sudoku	75.6% (340)	21.1% (95)	3.3% (15)
3	2048	72.3% (325)	24.4% (110)	3.3% (15)
4	Magic Square	50.9% (229)	44.2% (199)	4.9% (22)
5	Algebra Math Puzzle	39.4% (177)	55.3% (249)	5.3% (24)
6	Math Crossword	32.8% (148)	49.6% (223)	17.6% (79)
7	Kakuro	20% (90)	15% (68)	65% (292)
8	Ken Ken	35% (157)	25% (113)	40% (180)
9	Math Word Problem	72% (324)	25.8% (116)	2.2% (10)
10	Factor Tree Challenge	64.5% (290)	33.1% (149)	2.4% (11)
11	Numbers Jigsaw	38.3% (172)	59.3% (267)	2.4% (11)
12	Pyramid Puzzles	56% (252)	43.6% (196)	0.4% (2)
13	Tangram	42.9% (193)	53.3% (240)	3.8% (17)

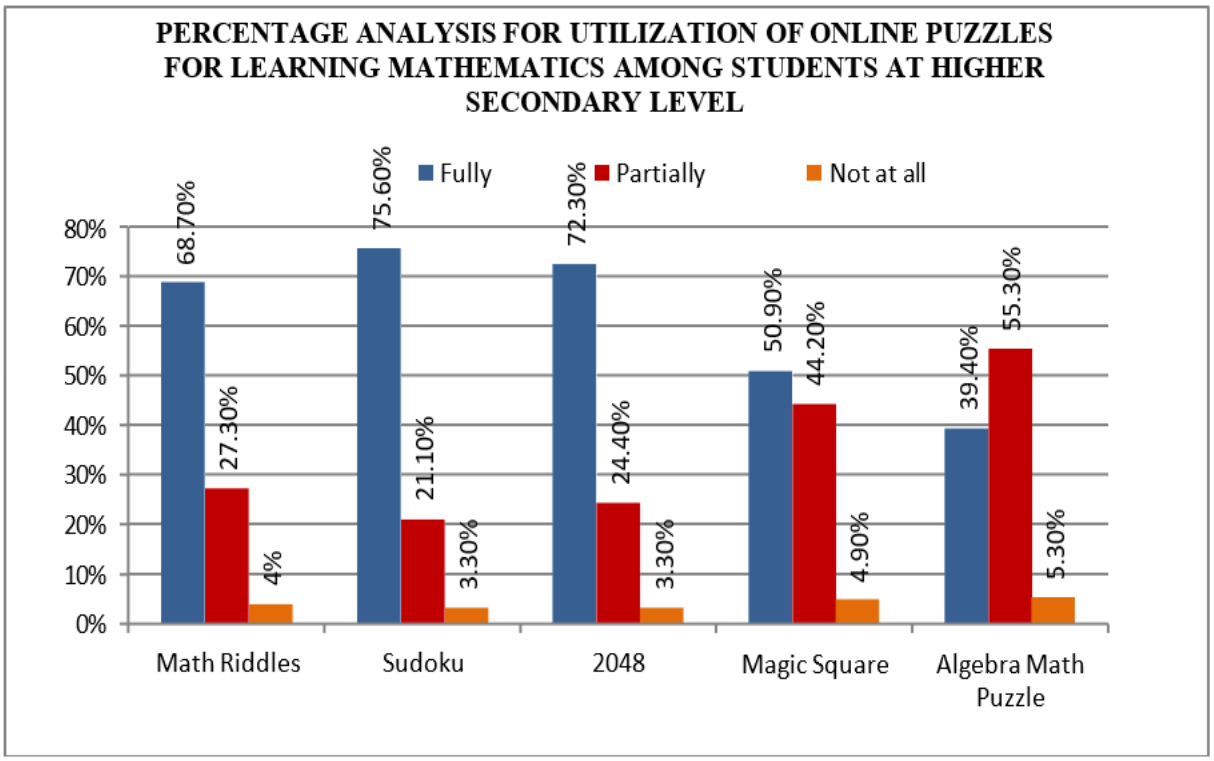
14	Symmetry Puzzles	43.3% (195)	51.8% (233)	4.9% (22)
15	Equation Balancing Puzzles	60.9% (274)	32% (144)	7.1% (32)
16	Product Square	42% (189)	55.6% (250)	2.4% (11)
17	Partition Clues	38.7% (174)	54.2% (244)	7.1% (32)
18	Math Maze	52.5% (236)	45.1% (203)	2.4% (11)
19	Pattern Blocks	52% (234)	47.6% (214)	0.4% (2)
20	Number Sequence Puzzle	65.3% (294)	26.4% (119)	8.2% (37)

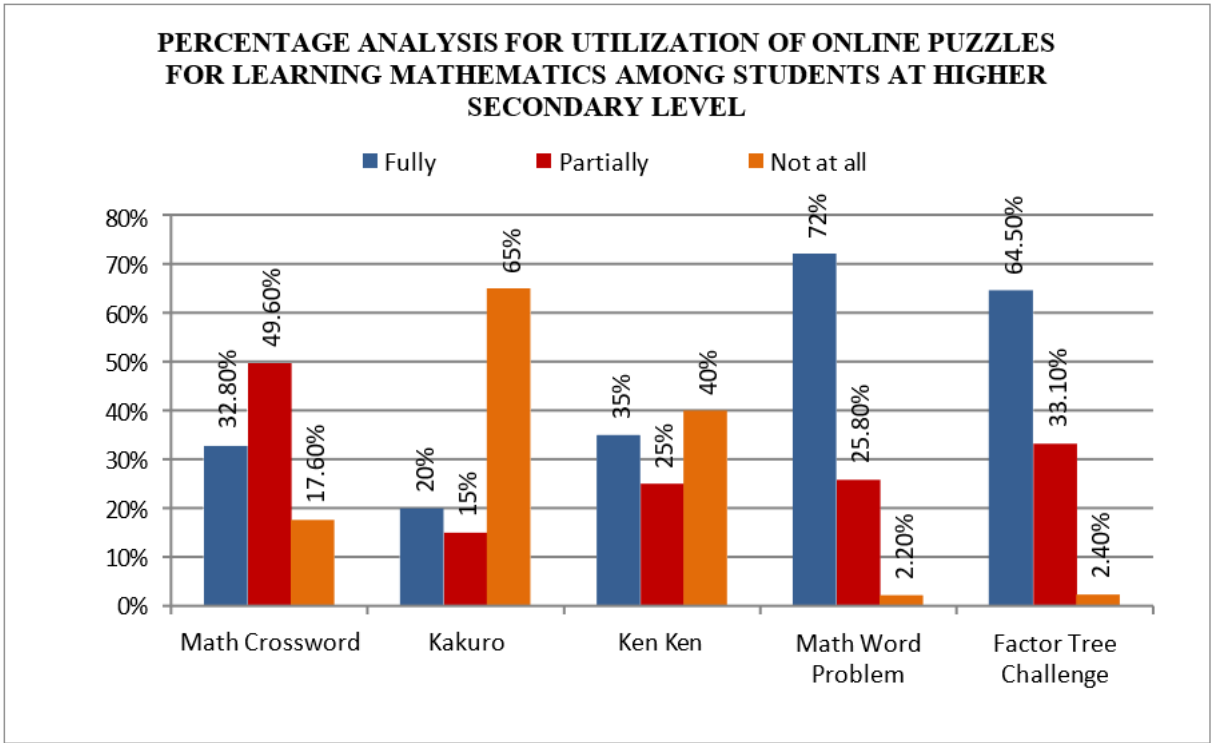
It is evident from the table 1 that the percentage analysis for the utilization of online puzzles for learning mathematics among students at higher secondary level reveals that,
The higher secondary students from 75% to 100% are using the following online puzzles viz.,

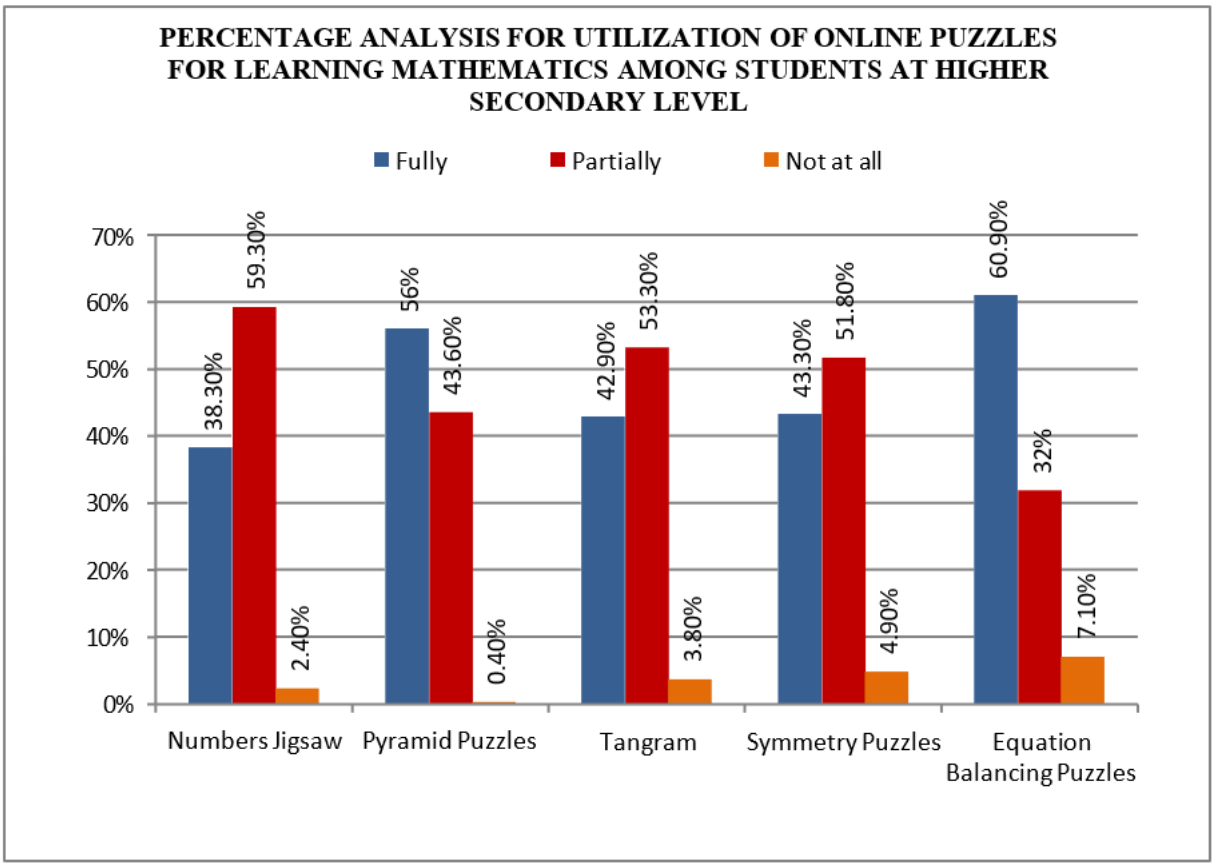
Sudoku (75.6%)
The higher secondary students from 50% to 75% are using the following online puzzles viz.,

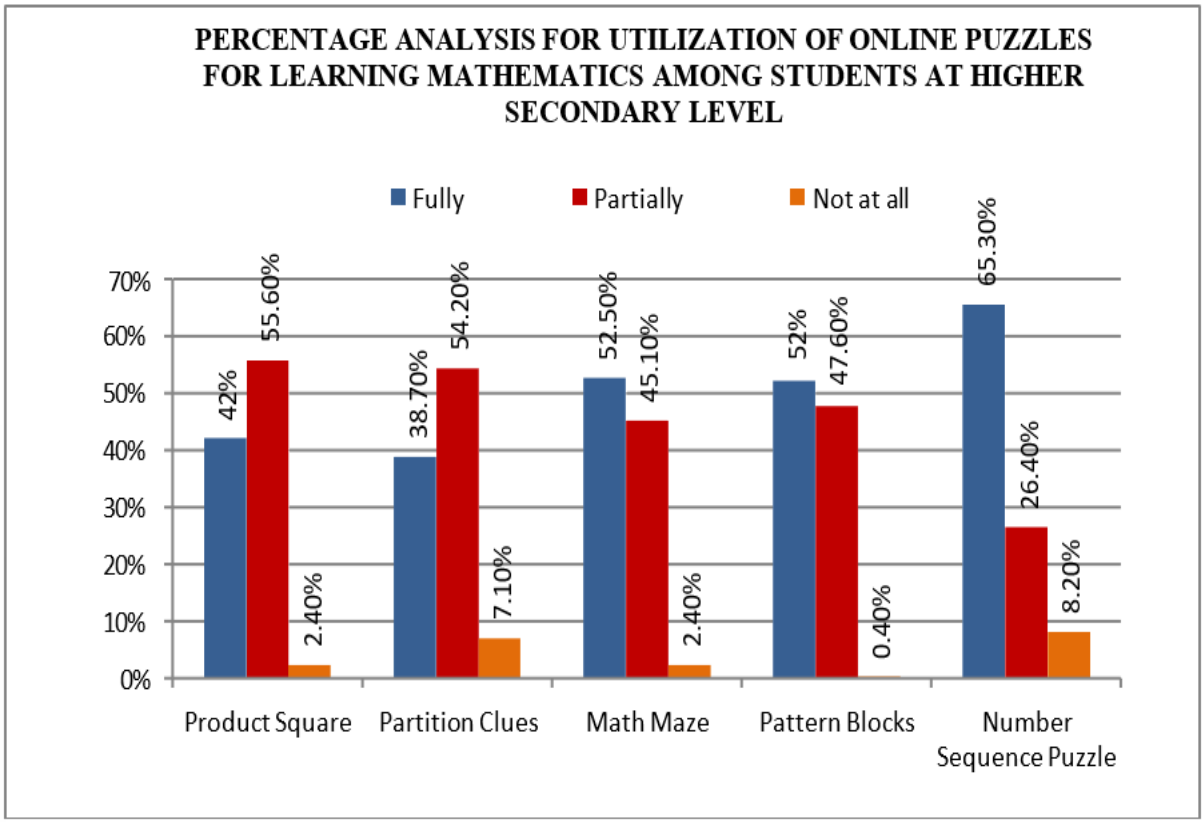
2048 (72.3%), Math Word Problem(72%), Math Riddles (68.7%), Numbers Sequence Puzzles (65.3%), Kakuro (65%), Factor Tree Challenge (64.5%), Equation Balancing Puzzles (60.9%), Numbers Jigsaw(59.3%), Pyramid Puzzles (56%), Product Square (55.6%), Algebra Math Puzzles(55.3%), Partition Clues (54.2%), Tangram(53.3%), Math Maze (52.5%), Pattern Blocks (52%), Symmetry Puzzles (51.8%) and Magic Square(50.9%).
The higher secondary students from below 50 % are using the following online puzzles viz., Math Crossword(49.6%) and Kenken (40%)

FIGURE 1 BAR DIAGRAM SHOWING PERCENTAGE ANALYSIS FOR UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL




PERCENTAGE ANALYSIS FOR UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL
Fully
Partially
Not at all
80%
70%
60%
50%
40%
30%
20%
10%
0%
32.80%
49.60%
17.60%
20%
15%
65%
35%
25%
40%
72%
25.80%
2.20%
64.50%
33.10%
2.40%
Math Crossword
Kakuro
Ken Ken
Math Word Problem
Factor Tree Challenge


PERCENTAGE ANALYSIS FOR UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL
Fully
Partially
Not at all
70%
60%
50%
40%
30%
20%
10%
0%
38.30%
59.30%
2.40%
56%
43.60%
0.40%
42.90%
53.30%
3.80%
43.30%
51.80%
4.90%
60.90%
32%
7.10%
Numbers Jigsaw
Pyramid Puzzles
Tangram
Symmetry Puzzles
Equation Balancing Puzzles



HYPOTHSIS 2

The extent of utilization of online puzzles for learning mathematics among students at higher secondary level is average.

TABLE 2 DESCRIPTIVE ANALYSIS ON THE EXTENT OF UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL

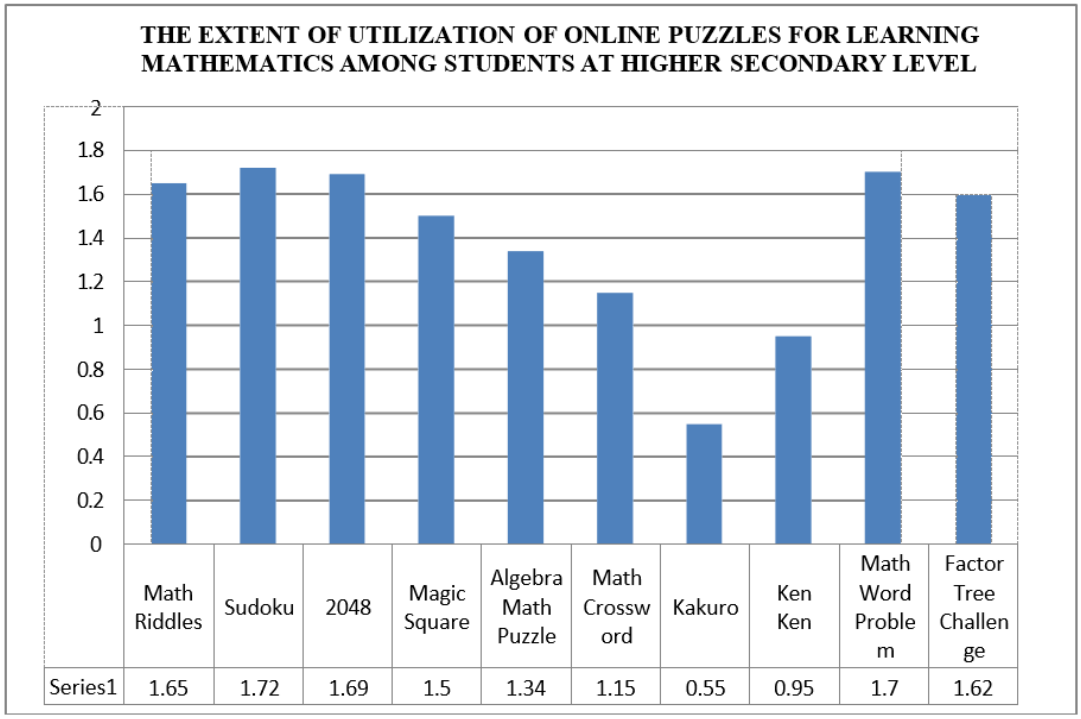
S.No	Online Puzzles	Extent Of Utilization Of Online Puzzles For Learning
1	Math Riddles	1.65
2	Sudoku	1.72
3	2048	1.69
4	Magic Square	1.50
5	Algebra Math Puzzle	1.34
6	Math Crossword	1.15
7	Kakuro	0.55
8	Ken Ken	0.95
9	Math Word Problem	1.70
10	Factor Tree Challenge	1.62
11	Numbers Jigsaw	1.36
12	Pyramid Puzzles	1.56
13	Tangram	1.39
14	Symmetry Puzzles	1.38
15	Equation Balancing Puzzles	1.54
16	Product Square	1.40
17	Partition Clues	1.32
18	Math Maze	1.50
19	Pattern Blocks	1.51
20	Number Sequence Puzzle	1.57

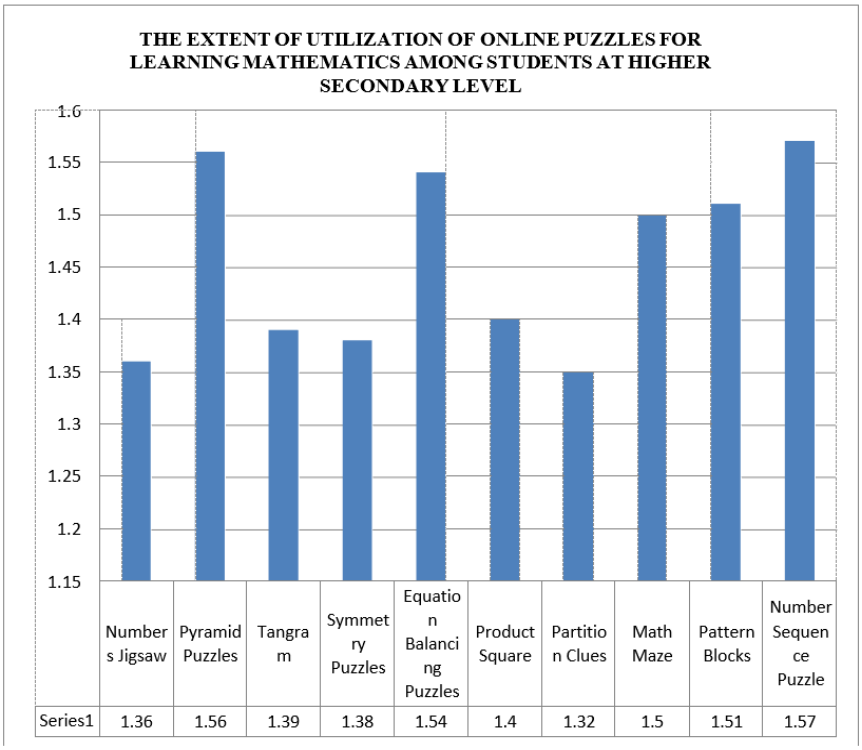
It is evident from table 2 that the descriptive analysis of the extent use of utilization of online puzzles for learning mathematics among students at higher secondary level reveals that,
The higher secondary students are fully use the following online puzzles viz.,

Math Riddles (1.65), Sudoku (1.72), 2048 (1.69), Magic Square (1.50), Math Word Problem (1.70), Factor Tree Challenge (1.62), Pyramid Puzzles (1.56), Equation Balancing Puzzles (1.54), Math Maze (1.50), Pattern Blocks (1.51) and Number Sequence Puzzles (1.57)
The higher secondary teachers use the following online puzzles to some extent viz.,

Algebra Math Puzzle (1.34), Math Crossword (1.15), Kakuro (0.55), KenKen (0.95), Numbers Jigsaw (1.36), Tangram (1.39), Symmetry Puzzles (1.38), Product Square (1.40) and Partition Clues (1.32)
It may conclude that the extent of
utilization of online puzzles for learning mathematics among students at higher secondary level is average.

FIGURE 2 DESCRIPTIVE ANALYSIS ON THE EXTENT OF UTILIZATION OF ONLINE PUZZLES FOR LEARNING MATHEMATICS AMONG STUDENTS AT HIGHER SECONDARY LEVEL





FINDINGS OF THE STUDY

1. The percentage analysis for the utilization of online puzzles for learning mathematics among students at higher secondary level reveals that,

The higher secondary students from 75% to 100% are using the following online puzzles viz., Sudoku (75.6%)

The higher secondary students from 50% to 75% are using the following online puzzles viz.,

2048 (72.3%), Math Word Problem(72%), Math Riddles (68.7%), Numbers Sequence Puzzles (65.3%), Kakuro (65%), Factor Tree Challenge (64.5%), Equation Balancing Puzzles (60.9%), Numbers Jigsaw(59.3%), Pyramid Puzzles (56%), Product Square (55.6%), Algebra Math Puzzles(55.3%), Partition Clues (54.2%), Tangram(53.3%), Math Maze (52.5%), Pattern Blocks (52%), Symmetry Puzzles (51.8%) and Magic Square(50.9%).

The higher secondary students from below 50 % are using the following online puzzles viz.,

Math Crossword(49.6%) and Kenken (40%)

2. The extent of utilization of online puzzles for learning mathematics among students at higher secondary level is average.

CONCLUSION

The study contributes to our understanding of the extent of utilization of online puzzles for learning mathematics at higher secondary level. The findings highlight the prevalence of online puzzles usage, as well as its positive impact on student's learning outcomes.

EDUCATIONAL IMPLICATIONS

Online puzzles hold significant potential to enhance mathematics learning by making it more engaging, interactive, and fun. However, it's crucial to be aware of the potential challenges and to integrate them thoughtfully into the curriculum with appropriate guidance and a balanced approach to maximize their educational impact.

BIBLIOGRAPHY

1. Doherty, M. J., Wimmer, M. C., Gollek, C., Stone, C., & Robinson, E. J. (2021). Piecing together the puzzle of pictorial representation: How jigsaw puzzles index metacognitive development. *Child development*, *92*(1), 205-221.

2. Karakoç, B., Eryılmaz, K., Turan Özpolat, E., & Yıldırım, İ. (2022). The effect of game-based learning on student achievement: A meta-analysis study. *Technology, Knowledge and Learning*, *27*(1), 207-222.

WEB REFERENCES

1. https://www.transum.org/Software/Puzzles/
2. https://www.mathsisfun.com/puzzles/