

## EFFECTIVENESS OF MEMORY GAME ON ACADEMIC PERFORMANCE OF PRIMARY SCHOOL STUDENTS

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### ABSTRACT

Gamification in education has become the focus of attention in recent years. While “gamification is the practice of using game design elements, game mechanics and game thinking in non-game activities to motivate participants”. Educational gamification is a teaching method that requires learners to participate in competitions according to preset rules. It has been an interdisciplinary and prevalent tool for educators to utilize in teaching in the past few years. The aim of this study was to find out the effectiveness of a memory game on academic performance of primary school students. The Experimental method was used for this study. The total sample was 80 students of IV standard. It consisted of 40 students in Control group and 40 students in Experimental group. The data were collected using appropriate tools and it was analyzed by t' test. The finding is that the academic performance of experimental group Students were higher than the Control group Students. The results of the post test for the experimental group are so better than the controlled one which show that games have a good effect on improving the achievement for the primary stage and to create an interactive environment. It is recommended to use games since they are very effective especially for the primary stages in teaching and games are helpful for the teacher as a procedure for subject acquisition.

**Keywords:** Memory Game, Matching Pair Cards Game and Primary School Students.

### INTRODUCTION

The main reason why games are considered effective learning aids is that "they spur motivation and students get very absorbed in the competitive aspects of the games; moreover, they try harder at games than in other courses" (Avedon, 1971). Naturally when playing games, students are trying to win or to beat other teams for themselves or on the behalf of their team. They are so competitive while playing because they want to have a turn to play, to score points and to win. In the class, students will definitely participate in the activities. Therefore, it is possible for a teacher to introduce students to new ideas, knowledge and so on. It can be clearly seen that games can capture students' attention and participation.

They can motivate students to want to learn more. Moreover, they can transform a boring class into a challenging one.

According to students' achievements we can assess through utilizing pre, and post tests if our students have improved or not, and if our procedure is useful, effective or not. Games and especially educational games are one of the techniques and procedures that the teacher may use in teaching. Games are often used as short warm-up activities or when there is some time left at the end of a lesson. As kids grow up and head towards school age, the importance of learning through playing games. Through games and playing, children can nurture their imagination, improve their ability to listen, as well as develop important cognitive skills that will aid their future development. And memory games are a vital part of this. Everyone has played some kind of memory game at some point. Whether that's spot the difference, simple pairing games using playing cards, or even doing a crossword. They all require the players to use their memory to complete the game. And in doing so, users are developing their key skills.

## **MEMORY GAME**

The memory game is a common children's game played with a set of cards. The cards have a picture on one side and each picture appears on two cards. The game starts with all the cards face down and players take turns to turn over two cards. If the two cards have the same picture, then they keep the cards, otherwise they turn the cards face down again. The winner is the person with the most cards when all the cards have been taken.

## **MEMORY GAME IN EDUCATION**

Playing memory games can improve other brain functions, such as attention, concentration, and focus. Memory games give space to critical thinking and that helps children nurture their attention to detail. Memory games can improve visual recognition. With many memory games based on spotting differences, or linking two related images, children improve their visual discrimination. This will lead to an acceleration in distinguishing images from one and another.

Short-term memory is key to playing memory games and playing them often will improve function in this area. A good short-term memory can improve a person's long-term memory too. Both are linked and being able to move things from your short-term memory into long-term will improve learning in other areas. Though memory games are a short-term boost, players have to plan their moves as they go. From revealing a card to plotting their next move, children can learn the importance of thinking ahead and plotting their next choice.

## **TYPES OF MEMORY GAME**

### ***Match Pair Cards***

The aim of this game is to match pairs of cards. Click on a card in the interactivity below to turn it over. Then click on another one. If the two cards match, they will stay face-up. If the two cards do not match, they will return to being face-down.

### ***Crossword puzzles***

Crosswords are one of the most classic brain training games. These games can help test your vocabulary skills and draw on knowledge from history, science and popular culture. You can perform crosswords online or through gaming apps or go with the more traditional route, such as printed books or newspapers. Crosswords are often used as a cognitive exercise to delay the onset of dementia, especially when made into a regular habit. Focus on puzzles that are challenging and keep your brain engaged. Because it's possible to strain your brain, limit yourself to one challenging puzzle per day.

### **Chess**

The game of chess was designed to be a mentally intensive and intellectually challenging game. It requires reliance on short-term memory to fully analyze the board and create a strategy for each move. You will also have to anticipate the moves of your opponent and make sure each move works in a way to help you achieve your end goal. This action triggers your long-term memory so you are exercising both portions of your brain in a shifting pattern.

### **Jigsaw puzzles**

Jigsaw puzzles are effective brain training games, as they require you to work the left and right sides of the brain at once. They also reinforce the connections between the brain cells, which improves mental speed and improves short-term memory. Jigsaw puzzles reinforce visual-spatial reasoning as well, as you need to look at the individual pieces and identify where they fit into the big picture.

### **Rebus puzzles**

A Rebus puzzle works well for improving memory and brainpower. This puzzle asks a question and then the clues to the answer are found in numbers, letters, pictures and symbols. Players must have knowledge of and be able to remember cliches and expressions to solve the puzzles.

### **Sudoku**

Sudoku can help improve your memory retrieval and stimulate other parts of your brain. To successfully complete this game, you are required to keep a range of numbers in your head while placing them mentally in one of the nine spaces on the grid. This game relies heavily on working memory to memorize the numbers and then uses logical thinking to figure out the next blank. Because Sudoku requires players to think strategically and use creative thinking to solve problems, it can help to increase both concentration and problem-solving skills. Players learn how to make decisions and take action with less hesitation.

## **BENEFITS OF MEMORY GAMES**

People who participate in brain games for a few hours a week have experienced lasting benefits. Research suggests that once people learn to have better control over their attention and mental processing abilities, they can apply what they learned from the brain games into day-to-day activities

- improve concentration
- train visual memory
- increase short term memory
- increase attention to detail
- improve the ability to find similarities and differences in objects
- help to classify objects that are grouped by similar traits
- improve vocabulary

## **REVIEW OF RELATED LITERATURE**

According to Carrier (1990) teachers should first consider the level of the game to fit their students' level. They should choose the game that fits the purposes of that class or the content. Moreover, teachers should consider students' characteristics: whether they are old or young, serious-minded or light-hearted, and highly motivated to learn or not. They should also consider when the game should be used.

According to Richard-Amato (1996), even though games are often associated with fun, we should not lose sight of their pedagogical values, particularly in social science teaching. Games are effective because they provide motivation, lower students' stress, and give them the opportunity for real communication.

Hadfield (1990) confirms that "games provide as much concentrated practice as a traditional drill and more importantly, they provide an opportunity for real communication, albeit within artificially defined limits, and thus constitute a bridge between classroom and the real word." Like in a traditional classroom, students have an opportunity to drill and practice using grammatical rules and other functions.

## **NEED FOR THE STUDY**

In view of the rapid development of technology, learners may expect teachers/lecturers to employ this tool in lessons/lectures (Rondon et al., 2013). In the field of education, researchers have been eager to find new strategies to enrich students' learning experiences, especially in this technology-driven world in which educational games are one of them (Minovic et al., 2012a). Gamification has become popular in education in recent years. Its advantages include, but not limited to, giving students the opportunity to experience learning in a multi-sensory, active and experimental environment. Specifically, learners can use these educational games for experimental learning to develop their decision-making and problem-solving skills in a dynamic learning environment (Adachi and Willoughby, 2013). In addition, students can receive feedback/results immediately to get answers, instead of receiving delayed feedback from traditional assessment methods (e.g., tests and examinations). Moreover, some educational gamification may help to reduce limitations, including time and place, as portable devices can enable students to study and/or learn anytime and anywhere. These user-friendly tools can make difficult subjects easier to understand and memorize (Hanus and Fox, 2015). In other words, with the use of educational games, the learning process is considered to be more interesting (Calliari, 1991), motivating (Sun-Lin and Chiou, 2019), achieving knowledge retention (Gros, 2007), increasing attention (Prensky, 2003), and can even enhance peer communication and social skills (Liao et al., 2011). Memory games are a fun method of exercising your mind to improve your memory. Like our bodies, the brain needs regular use to stay healthy and sharp. Memory games challenge the mind and help the gray matter in our brains - the part that impacts memory - to grow and expand. Research has shown that just 15 minutes each day of brain training can improve brain function.

The cognitive advantage of puzzles and other similar educational games in young children is well documented. Research in developmental psychology has demonstrated a significant and reproducible advantage in memory, overall cognitive skills, and spatial skills in children who play with puzzles between the ages of 5 and 14 years old. Since puzzles can improve our memory, concentration, vocabulary and reasoning skills it doesn't take a rocket scientist to see that they also raise our IQs. A study at the University of Michigan showed that doing puzzles for at least 25 minutes a day can boost your IQ by 4 points. Memory Games improving students long-term and working memory can improve students' performance by boosting their productivity, as well as decision - making and organizational skills. It also reduces stress which can further improve performance and overall happiness at work. Improving students' memory requires time and regular exercise of the brain. Gaming is really a workout for your mind disguised as fun. Studies have shown that playing video games regularly may increase gray matter in the brain and boost brain connectivity. Based on the previous study the Investigator selected Matching Pair Cards Game for this study to find out the Effectiveness of Memory Game on Academic Performance of Primary School Students.

## **OBJECTIVES OF THE STUDY**

1. To find out whether there is any significant difference between the academic performance of the participants in control group and those in the experimental group at Pre - Test level.
2. To find out whether there is any significant difference between the academic performance of the participants in control group and those in the experimental group at Post - Test level.
3. To find out whether there is any significant difference in the academic performance between boys and girls students of experimental group at Post-Test Level.
4. To find out whether there is any significant difference in the academic performance between rural and urban area students of experimental group at Post-Test Level.

## **HYPOTHESES OF THE STUDY**

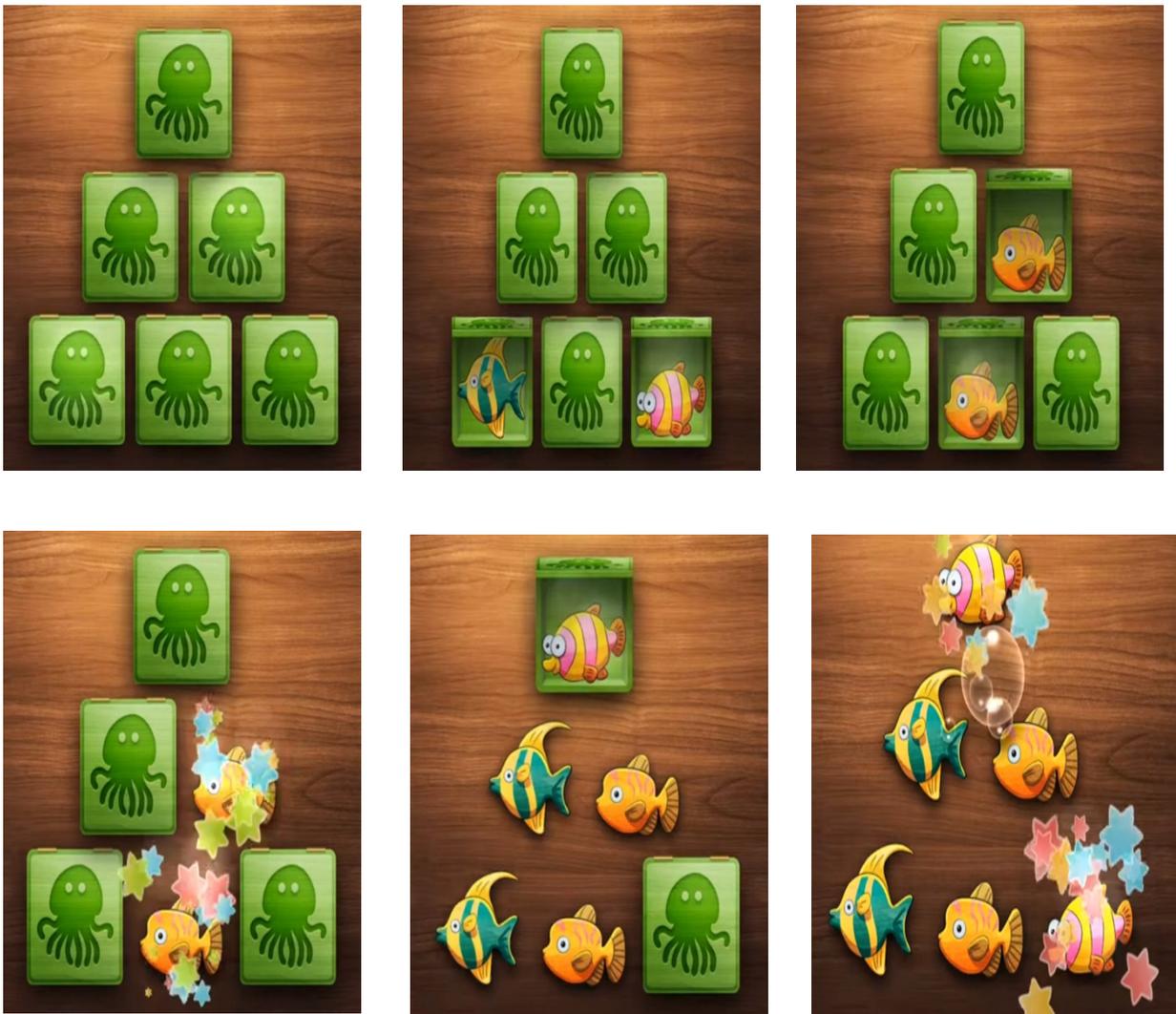
1. There is no significant difference between academic performance of the participants in control group and those in the experimental group at Pre-test level.
2. There is no significant difference between the academic performance of the participants in control group and those in the experimental group at Post-test level.
3. There is no significant difference in the academic performance between boys and girls students of experimental group at Post-Test Level.
4. There is no significant difference in the academic performance between rural and urban area students of experimental group at Post-Test Level.

## **METHODOLOGY OF THE STUDY**

In the present research, experimental method was employed. This study was 120 IV standard students from Kamaraj Matriculation School, Chidambaram, Cuddalore Districts in Tamil Nadu. Out of these 120 students, 80 students were selected, based on their performance in the first model exam, which is a common one. For that, those students who have secured 60% and above marks are alone selected. Further an entrance test prepared by the Investigator was administered to the 80 students thus selected. Based on the marks of the entrance test, students were arranged in descending order. From that the Investigator selected the first one for control group, next for experimental group. The control group consists of odd number of students and experimental group consists of even number of students.

The present study aims at finding the effectiveness of memory game on academic performance of primary school students. In this memory game, pictures are displayed on a grid for a limited time during which the player try to memorize the locations of the pictures. The first player flips over 2 cards to make a pair. If a match is made, the player keeps the cards, gets 1 point, and goes again. If not, the player flips the cards over and the next player goes, playing by the same rules. The game ends when all pairs are made and the person with the most points wins. This type of Memory Game has been used for this study.

Some frames of Matching Pair Cards Game are followed.



Picture 1. Matching Pair Cards Game

### Sample for the Study

The sample of 80 students of primary school level was taken to study from Kamaraj Matriculation School. The students of IV standard were the sample for this study. The sample were divided into two groups namely Control group and Experimental group. Control group was exposed to traditional method without playing Memory Games. It consists of 40 students of which belong to IV standard. In the same way experimental group was given treatment through Memory Games of Matching Pair Cards Game. It also consists of 40 students of which belong to IV standard. The random sampling technique was followed in the selection of the sample.

### Tools Used

1. Matching Pair Cards Game was used.
2. Achievement Test was used.
3. The Personal data of the samples were collected through the questionnaire.

### Statistical Techniques Used

Statistical techniques serve the fundamental purpose of the description and inferential analysis. 't' test was applied to analyze the deferential hypothesis.

### Analysis of Post-Test Performance

The following table furnishes the data on the Pre-Test and Post-Test performance of the Control and Experimental groups and also furnishes the significance of difference between the Academic Performance of Students in various groups in detail.

Table-1. Significance of difference between the Academic Performance of the Control and Experimental Group Students in Pre-Test Level

Sl.No.	Variable	N	Mean	S.D.	t' Test	Level of Significant
1	Control	40	14.3	1.9	0.55	Not Significant
	Experimental	40	14.1	2.16		

Table - 2. Significance of difference between the Academic Performance of the Control and Experimental Group Students in Post-Test Level

Sl.No.	Variable	N	Mean	S.D.	t' Test	Level of Significant
2	Control	40	71.27	6.44	17.35	Significant
	Experimental	40	90.6	2.83		

Table-3. Significance of difference between the Academic Performance of the Students with respect to Gender

Sl.No.	Variable	N	Mean	S.D.	t' Test	Level of Significant
3	Control	40	90.5	3.05	0.22	Not Significant
	Experimental	40	90.7	2.65		

Table - 4. Significance of difference between the Academic Performance of the Students with respect to Locality

Sl.No.	Variable	N	Mean	S.D.	t' Test	Level of Significant
4	Control	40	90.83	2.61	0.64	Not Significant
	Experimental	40	90.25	3.17		

## FINDINGS OF THE STUDY

1. The calculated  $t'$  value 0.55 is very much lesser than the critical value 1.99 at 0.05 level of significant. This implies that the difference in the academic performance of control group and experimental group students is not significant.
2. The calculated  $t'$  value 17.35 is very much greater than the critical value 1.99 at 0.05 level of significant. This implies that the difference in the academic performance of control group and experimental group is significant.
3. The calculated  $t'$  value 0.22 is very much lesser than the critical value 2.02 at 0.05 level of significant. This indicates that the difference in the academic performance of boys and girls is not significant.
4. The calculated  $t'$  value 0.64 is lesser than the critical value 2.02 at 0.05 level of significant. This indicates that the difference in the achievement rural and urban area students is not significant.

### Summary of the Findings

The major finding of the study reveals that memory games of matching pair cards game more effective. It improves the academic performance of primary school students. There is no significant difference between the control group and experimental group in the Pre-Test. But in the Post-Test the experimental group performed better than the control group.

## CONCLUSION

From the above study, the investigator has an idea that memory games of matching pair cards game provides greater opportunities for the students to learn. It is better than the traditional method of learning. It brings a new kind of experiences for the students. Therefore, the investigator desires that more number of educational institutions should use memory games of matching pair cards game to teach and make the process of teaching and learning more effective.

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