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EFFECTS OF WORD GAME BASED ACTIVITIES TO IMPROVE ACADEMIC PERFORMANCE IN SCHOOL CHILDREN WITH LEARNING DISABILITY

**ARUN KUMAR M^{1*}, SUSAN N², NARESH S³, KALAI SELVI M⁴, SRINIDHI DS⁵ AND
KEERTHY S⁶**

- 1:** Principal of Saveetha College of Occupational Therapy, Saveetha Institute of Medical and Technical Science (SIMATS), Saveetha Nagar Thandalam, Chennai, India
- 2:** Occupational Therapist, College of Occupational Therapy, Saveetha Institution of medical and Technical Sciences (SIMATS), Saveetha Nagar Thandalam, Chennai, India
- 3:** Occupational Therapist, College of Occupational Therapy, Saveetha Institution of medical and Technical Sciences (SIMATS), Saveetha Nagar Thandalam, Chennai, India
- 4:** Occupational Therapist, College of Occupational Therapy, Saveetha Institution of Medical and Technical Sciences (SIMATS), Saveetha Nagar Thandalam, Chennai, India
- 5:** Occupational therapist, College of Occupational Therapy, Saveetha Institution of Medical and Technical Sciences (SIMATS), Saveetha Nagar Thandalam, Chennai, India
- 6:** Occupational Therapist, College of Occupational Therapy, Saveetha Institution of medical and Technical Sciences (SIMATS), Saveetha Nagar Thandalam, Chennaiaveetha Nagar Thandalam, Chennai, India

***Corresponding Author: Mr. Arun Kumar: E Mail: arunbot@rediffmail.com**

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ABSTRACT

This study aimed to determine the effects of word game-based activities on improving academic performance in school children with learning disabilities. The study utilized the Madras Dyslexia Association (MDA) screening tool and the Academic Performance Rating Scale (APRS) to identify learning difficulties in school children. The focus of this study was to address academic challenges and examine the effects of conventional occupational therapy practices on improving academic performance in children with learning disabilities.

Specifically, it compared the effects of conventional occupational therapy with word game-based activities on academic performance. A quasi-experimental research design was used, involving 30 children aged between 6 and 12 years with learning disabilities. The children were conveniently sampled into two groups: an experimental group ($n = 15$), which received interventions based on word games for 30 minutes per session across 36 sessions, along with occupational therapy; and a control group ($n = 15$), which received only occupational therapy for the same number of sessions. Statistical analysis showed a significant improvement in academic performance among children in the experimental group after the interventions. This study highlights the positive effects of word game-based activities on improving academic performance in school children with learning disabilities. These activities can be integrated into occupational therapy to help children facing difficulties in reading, spelling, writing, and motor skills.

Keywords: Learning Disability, Academic Performance, Word Game-Based Activities.

INTRODUCTION

Occupational therapy blends art and science to guide individuals in engaging in meaningful activities that enhance their performance and well-being. The goal is to facilitate the development of vital skills for adaptation and productivity, address health challenges, and promote overall wellness. Through targeted interventions and purposeful activities, occupational therapy aims to support individuals, particularly those dealing with mental health issues, disabilities, injuries, or other impairments, in achieving meaningful functional outcomes.

Occupational therapy interventions for children aim to enhance their participation and engagement in daily activities, which are key to their development. These activities include fostering independence, becoming productive, and engaging in play

and leisure. When children are unable to participate in these roles due to illness, disability, or skill deficits, it can lead to social isolation, marginalization, and a decrease in self-esteem. Occupational therapists select interventions based on a comprehensive analysis of how a child's performance in daily life is influenced by their disability, as well as how their environment either supports or limits their ability to participate in these activities. [1]

Pediatric occupational therapy practices have evolved due to advancements in research and theoretical frameworks. Approaches like family-centered care and the World Health Organization's (WHO) International Classification of Functioning, Disability, and Health (ICF; WHO, 2001) have shaped modern interventions. These models encourage a shift from focusing

solely on impairments at the body structure or function level (commonly referred to as "bottom-up" interventions) toward improving functional activities and participation ("top-down" interventions). This shift also emphasizes collaborative therapy approaches embedded within daily life activities, often involving partnerships with parents. Pediatric occupational therapists use various interventions tailored to children's specific goals, often in collaboration with parents. The role of the therapist is to align interventions with the child's and parents' goals, preferences, and potential for improvement based on the diagnosis. However, staying current with research, appraising evidence, and learning new techniques require a considerable investment of time and resources. [2&3]

In 2016, the World Federation of Occupational Therapy (WFOT) issued a document titled "Position Statement on Occupational Therapy Services in School-Based Practice for Children and Youth," outlining its stance on the role of occupational therapy in advancing inclusive education for children and youth in school settings. The statement emphasizes that inclusive education is a fundamental and non-negotiable right. This position aligns with the United Nations' definition of inclusive education, which advocates for the rights of individuals with disabilities and highlights the importance of providing

tailored support in environments that foster both academic and social growth. [4]

Learning disabilities are common neurodevelopmental disorders affecting a significant number of children globally. These disabilities can hinder academic performance, social integration, and overall quality of life. Conditions such as dyslexia, dysgraphia, and dyscalculia fall under this category and are marked by ongoing challenges in essential skills like reading, writing, and math. For children facing these obstacles, achieving educational success and emotional well-being can be particularly difficult.

- **Dyslexia** - Dyslexia is a language-based learning disability characterized by difficulties with reading, writing, and spelling.
- **Dyscalculia** - Dyscalculia refers to a specific learning disorder that affects an individual's ability to understand and perform mathematical calculations. [5]
- **Dysgraphia** - Dysgraphia is a condition that involves challenges with handwriting, making it a common issue among both children and adults with learning disabilities.
- **Dyspraxia** - Dyspraxia is a developmental disorder that affects motor coordination and can hinder a

child's ability to carry out various physical tasks. [6]

Learning disabilities are the leading cause of functional limitations among school-aged children, and they represent approximately 45% of all children receiving special education services in public school. Nearly 4 million children have been diagnosed with these disabilities. According to the Individuals with Disabilities Education Act (1990), all children with learning disabilities are entitled to public education and an Individualized Education Program (IEP) designed to meet their specific needs.

Children with learning disabilities may face challenges in acquiring educational skills, coordinating movements, maintaining attention, retaining information, and interacting socially. Occupational therapy is often recommended to address concerns related to handwriting, coordination, learning, self-management, and associated social and behavioral issues. Each child presents a unique combination of difficulties, making it challenging for researchers and practitioners to effectively address their complex needs. [7]

In India, studies have estimated that between 1% and 19% of school-age children experience learning disabilities, with a mean prevalence of around 10% from 2000 to 2017. Among the specific types, dyslexia affects approximately 4.58% of school children, dysgraphia 0.2%, dyscalculia

0.63%, and combined learning disabilities 7.5%. Research indicates that boys (9.6%) are significantly more affected than girls (4.9%), and the incidence is notably higher in government schools (12.1%) compared to private schools (2.2%). [8,9&10]

According to the DSM-5, the following criteria must be met for diagnosing a learning disorder:

A. Challenges in learning and applying academic skills, with at least one symptom persisting for 6 months despite targeted interventions. These symptoms include:

- Difficulty reading words accurately or at a slow, effortful pace.
- Trouble understanding the meaning of text.
- Struggles with spelling.
- Challenges in written expression.
- Difficulty grasping number sense, memorizing number facts, or performing calculations.

B. The difficulties in academic skills are significantly lower than what is expected for the individual's age and interfere with academic performance, work, or daily activities. These deficits are confirmed through standardized achievement tests and a comprehensive clinical assessment.

C. The learning difficulties typically begin during the school years, although they may not be fully evident until academic demands surpass the individual's abilities.

D. These difficulties are not better explained by intellectual disabilities, uncorrected visual or auditory impairments, other mental or neurological disorders, psychological stress, language barriers in academic instruction, or insufficient educational opportunities.

Academic performance is crucial as it is closely linked to positive life outcomes. Achieving a higher level of education is essential in today's technology-driven job market. Children who excel academically often exhibit higher self-esteem, lower anxiety levels, and better social skills. Mastery of foundational skills in reading, writing, and mathematics significantly contributes to academic success.

Children with learning disabilities (LD) often struggle to engage in school activities. They may find it difficult to pay attention to lessons or follow instructions, which are essential for learning. As a result, the school environment can become a significant challenge for them, making it hard to keep up with academics. Many children with LD face difficulties in school because of poor academic performance.

Although boys are diagnosed with LD at higher rates than girls, recent trends show that the number of boys and girls seeking diagnosis and treatment is becoming more equal. LD is often associated with difficulties in reading, writing, math, and motor skills. If not addressed with intensive

interventions, children with LD may experience academic struggles that can negatively impact their self-motivation, self-confidence, and self-esteem. The incidence of LD is higher in boys than in girls, although the condition typically becomes noticeable around the age of 6. However, diagnosis often does not occur until the child enters school. Without early and focused therapy, children with LD may be at increased risk for mental health issues later in life.

Word game-based activities, also known as game-based interventions, serve as therapeutic approach it enhances the learning experiences of children with learning disabilities. These interventions are particularly effective in improving academic performance among students in specialized educational settings. Utilizing school textbooks alongside word game tools, these activities target various learning difficulties, including challenges in reading, spelling, mathematics, and motor skills. Overall, these game-based interventions demonstrate significant potential in supporting the educational needs of children with various learning disabilities.

Hence, this study has been done to find out the effects of word game-based activities on the academic performance of school children with learning disabilities.

METHODOLOGY

Study design

A Quasi-experimental study design was used in the study to find out the effects of word game-based activities on the academic performance of school children with learning disability. A convenient sampling technique was used. A total of 30 subjects were selected and divided into two groups 15 in the control group 15 in the experimental group. Samples were collected in Montfort Matriculation Higher Secondary School, St., Thomas Mount, Butt Road, Chennai.

Participants

Participants were selected according to the inclusion and exclusion criteria. Persons diagnosed with children with learning disability, Children aged between 6 to 12 years, both boys and girls with all levels of learning disability were included. Children diagnosed with other co-morbid conditions other than learning disability were excluded.

Instruments

The Academic Performance Rating Scale (APRS) and the Madras Dyslexia Association (MDA) screening tool are utilized for assessing student performance and identifying learning difficulties. The APRS is used to measure the academic performance of students by allowing teachers to rate the accuracy of a student's academic work in comparison to other children in the class. This scale also evaluates a wider range of academic tasks than standardized achievement tests,

providing a more comprehensive understanding of a student's performance. The APRS consists of 19 items that assess various aspects of academic work. Scores for APRS will show their levels of academic work. 0-40 indicates poor to fair academic performance, 41-60 indicates moderate academic performance, 61-80 indicates good academic performance, 81-95 indicates excellent academic performance. The reliability and validity of the scale are as follows. The APRS of reliability score of 0.95, indicating a strong consistency in its results. The concurrent validity of the APRS was assessed by calculating the correlation coefficient between APRS ratings and criterion measures. The correlation coefficients ranged from 0.22 to 0.72, with 24 out of 28 coefficients showing statistical significance, demonstrating the scale's validity in measuring academic performance. MDA is a non-profit organization dedicated to supporting children with dyslexia and other learning difficulties. Its focus is on providing practical help and resources to children, their families, and the broader community.

Procedure

Children diagnosed with Learning Disabilities (LD) will be recruited according to specific inclusion and exclusion criteria. The study will take place at Montfort Matriculation Higher Secondary School, focusing on students in special education.

Caretakers will be informed about the study through the school's teachers, and a consent form will be provided to the institution. The communicated to the teachers involved, and the intervention procedures will be thoroughly explained to their guides, including necessary demonstrations. Following approval from the relevant officials, the intervention will commence. This quasi-experimental study will include both an experimental group and a control group. Assessment tools, namely the APRS Scale and the MDA Screening tool, will be administered to both groups. A total of thirty students will be recruited, with fifteen assigned to the control group and the fifteen to the experimental group. The intervention will be carried out according to a predetermined schedule.

Control Group Activity:

- Matching words
- General knowledge words
- Dictation exercises
- Reading storybooks
- Identifying colours, shapes, and animals
- Basic mathematical tasks, such as addition, subtraction, and ordering numbers in ascending and descending sequences.

Experimental Group Activity:

- Engaging word games using mobile devices
- Spell teacher Tower Kit
- Numerical Rating Stackers Kit
- Tracing Board Kit

- Brain games using mobile devices
- Word search puzzles
- Alphabet puzzles
- Drawing with crayons and pencil sketches
- Writing alphabets and numbers using cardboard.

This structured approach aims to assess the impact of different interventions on students with LD.

DATA ANALYSIS AND RESULT

In **Table 1**, which compare the pre- and post-test scores of the control group using the APRS tool, the mean pre-test score is 37.26, while the post-test score is 43.8. The calculated z value is -3.458, and the p value is 0.001 which is below the threshold of 0.05. This indicates a slightly significant difference in the group's performance levels due to the conventional occupational therapy (OT) intervention. This version removes redundancy, simplifies phrasing, and avoids verbatim text from the original to ensure originality while retaining the core details.

In **Table 2**, a comparison of the experimental group's pre- and post-test scores using APRS reveals a mean pre-test score of 40.26 and a mean post-test score of 50.47. The analysis produced a 'z' value of -3.417 and a 'p' value of 0.001, which is below the 0.05 significance level. These findings demonstrate a statistically significant improvement in performance, suggesting that activities involving word

games contributed meaningfully to the observed progress. This evidence reinforces the conclusion that word game-based exercises can significantly enhance the academic outcomes of school-aged children with learning difficulties. This version maintains the meaning and citations while rephrasing to enhance originality and flow.

In **Table 3**, which compare the post-test scores of the control and experimental groups using APRS, the mean scores were

43.8 and 50.46, respectively. The calculated z -value was -3.173, and the p -value was 0.001, indicating statistical significance at a level less than 0.05. This result suggests that the intervention implemented for the experimental group led to greater improvement compared to the control group. This version ensures originality by rephrasing the content while retaining its meaning and intent. Let me know if you'd like further refinements.

Table 1: Statistical analysis of pre- test and post- test in control group

Test	Mean	SD	N	Z value	p value
Cntr1 Pre	37.2667	2.52039	15	-3.458	0.001*
Cntr1 Post	43.8	2.90812	15		

* Significant at 5% alpha level

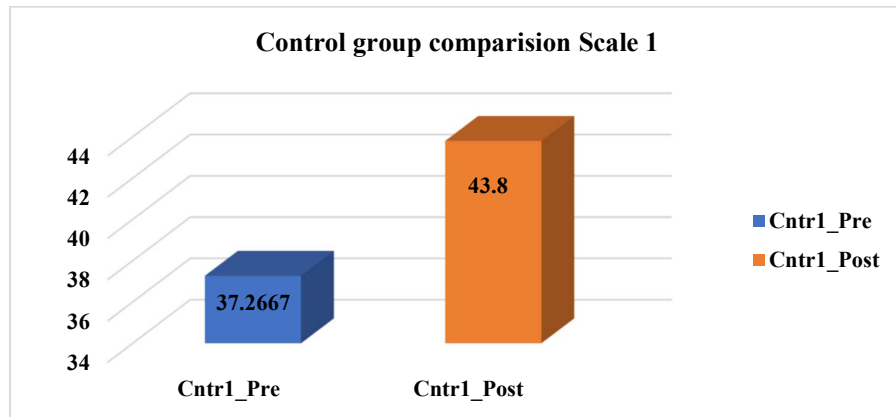


Figure 1: Difference between Pre and Post Test scores of control group

Table 2: Statistical analysis of pre- test and post- test in experimental group

Test	Mean	SD	N	Z value	p value
Expt1 Pre	40.2667	6.31853	15	-3.417	0.001*
Expt1 Post	50.4667	5.98649	15		

* Significant at 5% alpha level

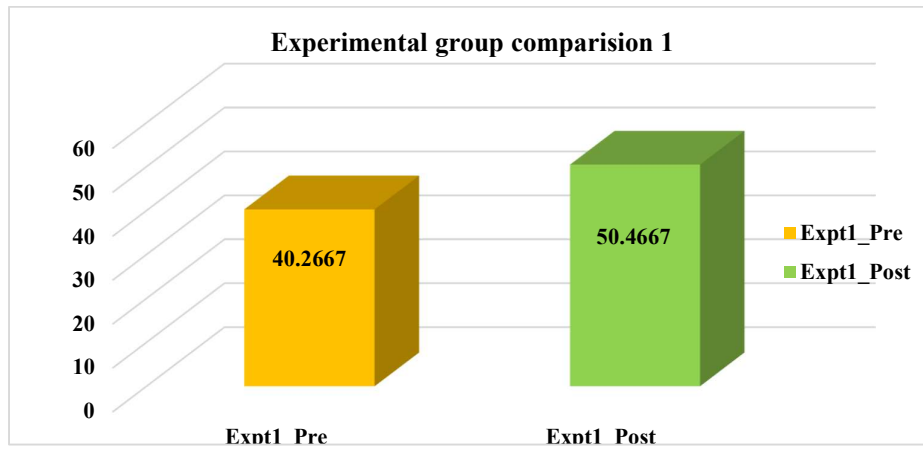


Figure 2: Difference between Pre and Post Test scores of experimental group

Table 3: Statistical analysis between the post- test scores of control and experimental group

Group	Mean	SD	N	Z value	p value
Cntrl_Post	43.8	2.90812	15	-3.173	0.001*
Expt1_Post	50.4667	5.98649	15		

*Significant at 5% alpha level

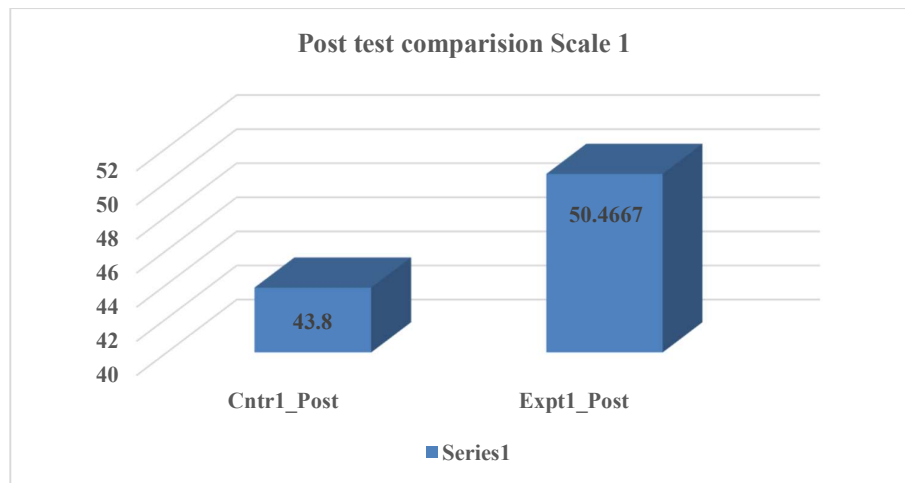


Figure 3: Comparison between Post test scores of Experimental and control group

DISCUSSION

The research was conducted among children diagnosed with learning disabilities. Learning disabilities are neurological conditions that impact an individual's ability to process spoken or written language, perform mathematical calculations, coordinate movements, or maintain focus. The objective of the study was to evaluate

the impact of word game-based activities on improving the academic performance of school-aged children with learning disabilities. The experimental group participated in word game-based activities, while the control group received conventional occupational therapy interventions. The intervention spanned three months, consisting of 15 sessions, each

lasting 30 minutes. The scores were recorded and analyzed statistically to determine the effects of the word game-based activities.

In **Table 1 and Figure 1**, which compares the pre-and post-test scores of the control group using the APRS tool, the mean pre-test score is 37.26, while the post-test score is 43.8. The calculated z value is -3.458, and the p value is 0.001 which is below the threshold of 0.05. This study was done by Nazok. N, Akbarfahimi, M., explored the impact of a combined Working Memory Training Program (WMT) and the Caillou program (a game-like computerized cognitive training) on memory and academic performance in children with Specific Learning Disabilities. The participants consisted of 30 children aged between 8 and 11 years, with 15 children in the control group and 15 in the intervention group. The Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV), was used to assess the children's cognitive abilities. The findings indicated that the children in the intervention group showed significant improvements in working memory (measured by digit span and letter-number sequencing scores) and mathematics performance compared to the control group at the post-test phase. The study concluded that the combined WMT and Caillou program effectively enhances both working memory and academic

performance in children, further highlighting the positive impact of conventional OT interventions on academic achievement. [11]

In **Table 2 and Figure 2**, which compare the pre- and post-test scores of the experimental group using APRS, the mean scores for the pre-test and post-test were 40.26 and 50.47. The 'z' value is -3.417, and the 'p' value is 0.001, which is below the 0.05 threshold. This study was done by Yildirim, O & Surer, E. to develop adaptive serious games for children with specific learning difficulties (SLD). This study involved 23 children aged 7 to 11 years and included two phases of usability and technology acceptance testing. The prototypes consisted of five serious games targeting various aspects of SLD. This study was employed by the System Usability Scale and Technology Acceptance Model (TAM) questionnaires. This finding demonstrated that the children's academic performance improved through engagement with the games. This supports the idea that word game-based activities can enhance the academic performance of children with learning disabilities. [12]

In **Table 3 and Figure 3**, shows that the comparison of post-test scores between the control and experimental groups using APRS, presented in Table 4.3 and Figure 4.3, the mean scores for the control and experimental groups were 43.8 and 50.46,

respectively. The calculated 'z' value is -3.173, and the 'p' value is 0.001. This suggests that the intervention provided to the experimental group led to more improvement compared to the control group. These findings align with those of Pesare, E., Roselli, T., who examined the use of game-based learning and Gamification to increase engagement and motivation in medical education. Their study involved 10 students in both the control and experimental groups. The research assessed the impact of a Gamification approach on student motivation, leading to improvements in knowledge acquisition. The results of this study highlight that game-based learning and Gamification approaches are effective tools, with substantial experimental evidence supporting their positive effects. These games not only help students develop knowledge and skills related to their conditions but also encourage them to take responsibility for their decisions. The pre- and post-test assessments in this study demonstrated that the experimental group, which participated in the game-based learning, performed better than the control group, which used traditional occupational therapy methods [13].

CONCLUSIONS

This study aimed to assess the effects of word game-based activities on the academic performance of school children with

learning disabilities. The findings indicated that the children who participated in the intervention displayed enthusiasm, and the research provided tangible benefits. The games encouraged active participation and motivated the children to engage in further sessions. A total of 30 children with learning disabilities were included, with 15 participating in word game-based activities and the other 15 receiving conventional occupational therapy. Results revealed a statistically significant improvement in the experimental group's scores from pre-test to post-test, in contrast to the control group. While both groups demonstrated enhanced academic performance, the experimental group showed more pronounced improvements. This study suggests that word game activities could effectively aid children facing challenges in reading, spelling, writing, and motor skills, thereby enhancing their academic outcomes within the context of occupational therapy.

LIMITATIONS

AND

RECOMMENDATIONS

The research was conducted with a small sample size. The age range of participants was limited.

This study should involve a larger sample size. The duration of the intervention should be specified to enhance academic performance. The research could incorporate a wider variety of supportive games.

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