PalArch's Journal of Archaeology of Egypt / Egyptology

OCCUPATIONAL THERAPY AND SPECIAL EDUCATION AS REMEDIAL INTERVENTION TO ENHANCECOGNITIVE PROCESSES OF CHILDREN WITH SPECIFIC LEARNING DISABILITY

Udita Khurana[1]; Neelima Chopra[2]

[1]PhD Scholar; [2]Associate Professor, CECDR, Jamia Millia Islamia, Delhi

Udita Khurana, Neelima Chopra, Occupational Therapy and Special Education as Remedial Intervention to EnhanceCognitive Processes of Children with Specific Learning Disability-Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7), ISSN 1567-214x

Abstract: Learning difficulties have a multidimensional impact on children and affect cognitive processing as well. The present study aims to understand the effect of occupational therapy and special education on cognitive processing of children with specific learning disability. For this purpose, two children, aged seven years facing dyslexia were taken from a private school. They both were provided with occupational therapy and special education interventions for a period of one month. Cognitive assessment system was used in a pre and post setting before and after the intervention to record the changes in cognitive processing level. For occupational therapy intervention Logicco Piccolo, by Grolier was used and for special education through Individualised Education Plan the intervention for English language was focused upon. The results indicated that occupational therapy intervention did bring about a change in the cognitive processing level of the child. Significant change was seen in the simultaneous subsets on the cognitive assessment system for both occupational therapy and special education intervention.

Keywords: **specificlearning disability, dyslexia, occupational therapy, special education, cognitive assessment system**

1. INTRODUCTION

Some children require extra support and assistance and face challenges in their daily functioning. Their needs are often more complex than those of other children. These children are often described as having special or exceptional needs. They need added navigation and supervision in achieving academic, social and emotional milestones. Learning disabilities or learning disorders, are used to denote a broad range of learning problems. Learning disabilities are neurologically based processing problems. There is a difference in how the child's brain is connected

which in turn affects how the child processes the incoming information. They usually face complications in reading, writing, reasoning and maths. Children dealing with learning disabilities find learning and understanding concepts more demanding than their peers, they do learn and proceed but at a slower rate than other children. The types of learning disabilities are like dyslexia which is a language based and reading based learning disability. Children dealing with dyslexia face problems in accurate reading and fluency of speech while reading. Other difficulties that they can face could be in reading comprehension, spelling and writing. Then dysgraphiais a learning disability that affects written expression. Dysgraphia manifests in form of problems with spellings, poor handwriting and not being able to put your thoughts on paper. The other type is dyscalculia disability that concerns to mathematical abilities. Children face difficulties in number related concepts. Commonly shown symptoms of dyscalculia are trouble in understanding signs of mathematical operation like addition, subtraction. They also face problem in following steps in solving sums.

1.2 ***Occupational Therapy:*** Occupational therapists use a comprehensive approach in dealing with children having special needs. Occupational therapy can provide valuable support to children with learning disabilities and push them towards path to independence and developing new skills. The therapist aims at working on the underlying motor problems, attentional difficulties or any visual perceptual deficits if present that could be playing a role in academic difficulties. It is often seen that children with learning difficulties face problems with following routines, the therapist can help in initiating a routine and help in following it by breaking it down for the child to make it easier. Occupational therapist can use a variety of activities and tools and techniques for the sessions they conduct. They can use simple techniques like targets to enhance attention and concentration and increase eye hand coordination. They can also use simple activities like making the child copy from the board to enhance focus. Occupational therapy provides a very fun based approach towards learning and enhancing one's skills.

1.3 ***Special Education:***When we think of special education, the usual picture that pops to our mind is of a child being taught separately by a teacher apart from all other kids. This was the approach typically followed in the past. Special education is now much more divergent. The ultimate goal is to help the child learn but not by excluding them from other children. Most of the students facing learning disabilities now attend regular schools, along with special education classes for an hour or two for individual attention. Individual attention helps in focusing on their weak points and enhancing their performance.When it comes to assisting the learning disabled there is no one for all approach. The plans are tailored according to the needs of the child. Some children might need more help in reading while some may need more in phonological awareness. Some might need help in mathematics while the other in writing. So, the special education

plan is developed according to the issue faced by the child.Occupational therapy and special education both aim to help the child suffering from learning disability cope better with their tasks of daily functioning. Special education on one hand aims to provide individual attention to the child and focus more on concepts he finds difficult and make him understand those by going at a slower pace, a pace that is more suitable and comfortable for the child. On the other hand, occupational therapy provides for a more interactive and a fun based approach to learning and improving upon the skills of the child. Occupational therapy by focusing on easy and simple activities, secretly enhances the child's attention and concentration levels.

2. REVIEW OF LITERATURE

Learning disabilities are one of the most common disabilities present among school going children. Children often struggle with reading, writing, comprehension, mathematical abilities. Kuriyan (2016) focused on published articles and journals to estimate the prevalence. They found that one to nineteen percent of children going to school are facing learning disabilities. Learning difficulties impact all areas of life, children often face issues with attention, concentration, organization and planning. This argument was substantiated by a research conducted by Rosenblum. A & Aloni(2010) T to know if any relationship existed between handwriting performance and organizational abilities. The answer came out to be yes. Participants were assessed through Hebrew handwriting analysis and their parents completed questionnaire for student's organization abilities for parents (QASOA-P). correlations emerged between dysgraphia handwriting an organizational ability. Occupational therapy is usually undertaken to improve visual motor or perception skills. Visual motor skills play a major role in the learning process. An issue in these skills is bound to cause problems in further learning. Mandani (2010) found It that there was indeed a positive effect of OT on visual motor skills. Similar conclusions were also presented by Sanghvi (2005) they stated that occupational therapy sessions indeed brought a difference in visual motor integration and OT does provide a strong base for treating learning disabilities. PASS theory of cognitive processing says that our cognitive functioning is based on four process and these four processes affect all areas of our lives. The cognitive assessment system is built upon the lines of PASS model. It says that our cognitive processing can predict how well we can function in various areas of our lives. The use of PASS model to understand relation between cognitive processing and reading has provided us with meaningful results.Georgiou (2014) says reading comprehension is highly related to simultaneous processing and problems in reading difficulties are majorly link to issues in successive processing. Nation, K (2002) found that the level of cognitive abilities had to an influence on reading comprehension. A cognitive approach for children with learning difficulties provides better results. Special instructors use a variety of techniques to help children with learning disabilities comprehend information in a better manner. Ciullo (2019) concluded that reading comprehension was the most preferred method to help learning disabled students. Cognitive based remediation programs have a role to

play in improving comprehension scores, shamita (2010). Special educators use a variety of techniques like repeated readings, reading comprehensions to help children with dyslexia. Filickova, M (2016) found that reading comprehension was related to simultaneous processing. cognitive processes like attention also affect reading comprehension as seen by Yildiz, M (2017).

3. METHOD

3.1 ***Aim:***The aim of the study was to assess the effect of occupational therapy and the effect of special education on cognitive processing levels of children with learning disabilities.

3.2 Objectives

i. To assess the level of cognitive processing pre and post occupational therapy intervention on children with learning disabilities.

ii. To assess the level of cognitive processing pre and post special education intervention on children with learning disabilities.

3.3 ***Sample:*** The sample employed was two children facing learning difficulties. One child had sessions of occupational therapy and other child had sessions of special education for a period of one month. Both children were aged seven years and were taken from a private school**.**

3.4 ***Tools used:***Cognitive Assessment System (Jack A Naglieri and J.P Das) was administeredon both the children. CAS is an assessment battery designed to evaluate cognitive processing in children. The standard battery would be administered to both the children.

3.5 ***Procedure:***The cognitive assessment system was used in a pre and post-test setting. A pre-test was conducted on both samples and the scores obtained by the both the samples on cognitive assessment system were noted down. After the conduction of the test, the interventions took place.One sample was provided with occupational therapy sessions and the other sample was provided with special education sessions for a period of one month. The sessions took place three times a week and each session lasted for fifty minutes. A total of twelve sessions was done for both interventions. The sessions were held on alternate days. For occupational therapy intervention we used a tool called Logico piccolo by Grolier. Logico piccolo is a learning system specially designed for children. It facilitates cognitive development of the child. Logico piccolo is designed for various age groups. We used the one for 5- 8 years of age also called the green piccolo. It consists of a learning board, various card booklets and a series of learning cards. The answer board has ten coloured buttons, which can be shifted up and down. we used four booklets for the session, the traces booklet, concentration and perception booklet, spatial positioning and patterns booklet. At the start of the session the child was

provided with the first learning card, the instructions for each card is written on top. The left side of the card has ten images marked with a coloured spot. Which corresponds to the coloured button on the answering board. The child had to match the coloured button on the board and picture on the card. The booklet has the cards numbered and they are in increasing order of difficulty. We used a total of four booklets for the intervention. The first booklet we used was the traces booklet, the child is required to his way out of the traces and reach to the end. There is a total of 16 learning cards in each booklet. the complexity and difficulty increase progressively as we move from one learning card to the next. The second booklet was the concentration booklet. The booklet consists of different activities like finding the odd one out, matching shapes etc. The third booklet we used was the spatial positioning booklet. It requires the child to match the exact pictures on the learning board. Lastly, we used the pattern booklet, it requires the child to follow a set of given patterns and decide what comes next. each of these are arranged in increasing order of difficulty. For each session a total of two to three cards were given from two booklets each, along with the learning cards a series of worksheets were made on the lines of Grolier that were provided by the school for use in the sessions. along with using the logico piccolo we also used a series of worksheets provided by the school made upon the lines of visual information analysis, the primary approach followed by logico.

For the special education intervention, English language was the main focus. Four areas were chosen namely daily reading task, picture comprehension, copying and making sentences. all sessions included a daily reading task, the child was asked to read a passage and mistakes made were noted. The second task repeated everyday was the copying task. The child was asked to copy a passage from the board to her notebook, the mistakes and omissions made were noted. The sessions also included reading comprehension, the task required the child to read a passage and answer questions related to it.. The child was given five different words every day and was asked to make sentences on the given words. The same procedure was repeated for all twelve sessions

After a period of month, when both the interventions were completed a post test was conducted again by using the cognitive assessment system and scores were noted down. Both the results were assessed to see if the interventions brought any significant difference in the cognitive processing level of the children.

3.6 ***Statistical Analysis:***Descriptive analysis and t test was used to see if any significant difference was present in the cognitive processing level pre and post the two interventions.

4. RESULTS

4.1 Pre and Post-testIntervention scores of Occupational Therapy

Table I: ***PASS scale standard scores***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	90.80	11.366	-5.492	.011
Post-test	105.40	7.127		

****significant at 0.05 level***

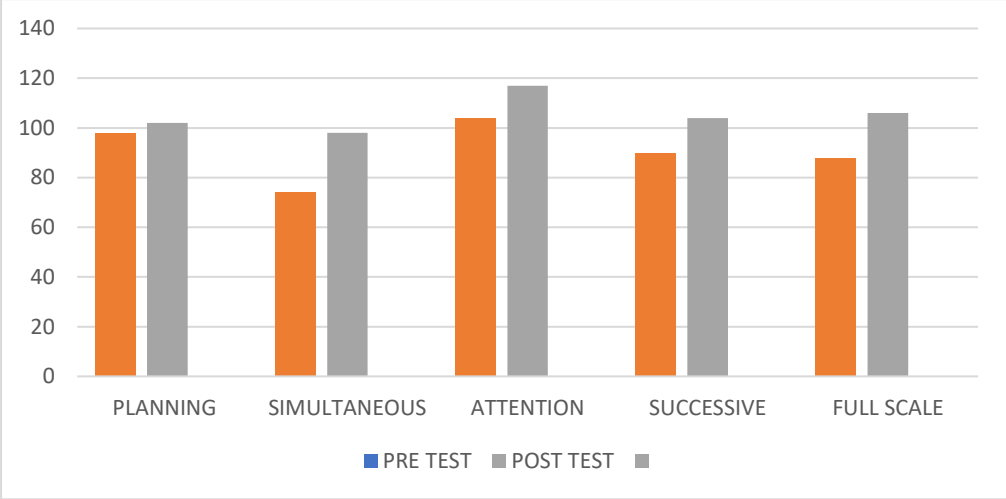

***Figure 1*. Bar diagram representing difference between pre and post-test standard scale score**

The above table& figure represents the difference between the pre and post test scores on the PASS scale standard scores.

Table II: ***Pre and post test scores on Planning subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	39.667	41.585	-1.170	.362
Post-test	43	40.632		

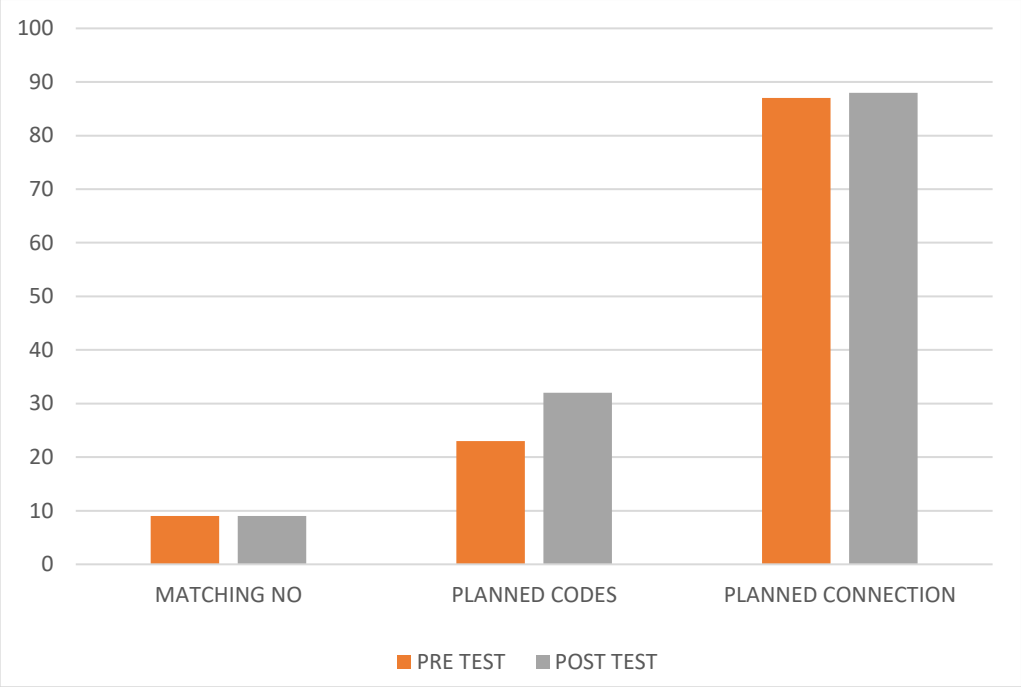

Figure 2. **Bar diagram representing pre and post test scores on Planning subset**

The above table& figure represents the difference between the pre and post test scores on planning subset.

Table III: ***Pre and Post test scores on Simultaneous subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	6.333	3.785	-11.00	.008
Post-test	10	4.358		

****significant at 0.05***

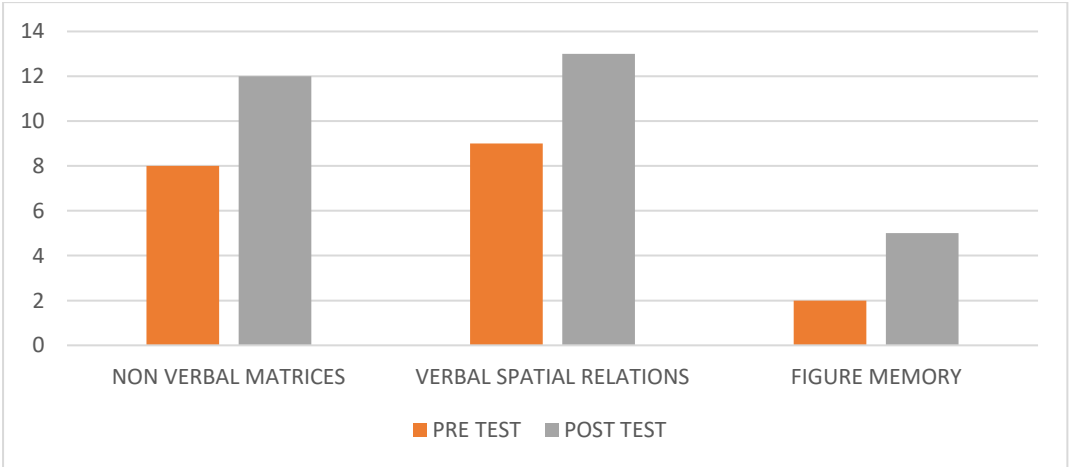

Figure 3. **Bar diagram representing the pre and post test scores on Simultaneous subset.**

The above table& figure represents the difference between the pre and post test scores on simultaneous subset.

Table IV: ***Pre and post test scores on Attention subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	36.667	25.482	-1.698	.232
Post-test	54.667	43.592		

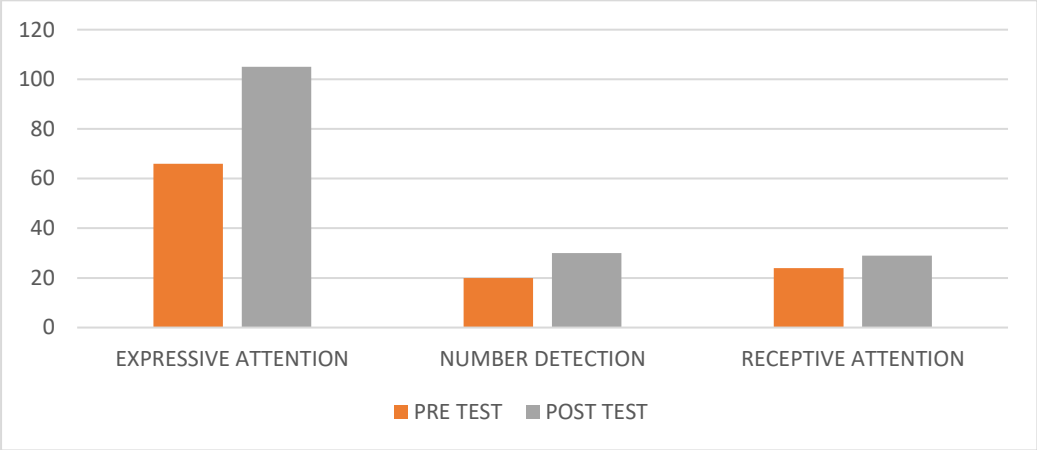

Figure 4. **Bar diagram representing the pre and post test scores on Attention subset.**

The above table& figure represents the difference between the pre and post test scores on attention subset.

Table V: ***Pre and post test scores on Successive subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	50	76.216	.750	.531
Post-test	44.21	62.36		

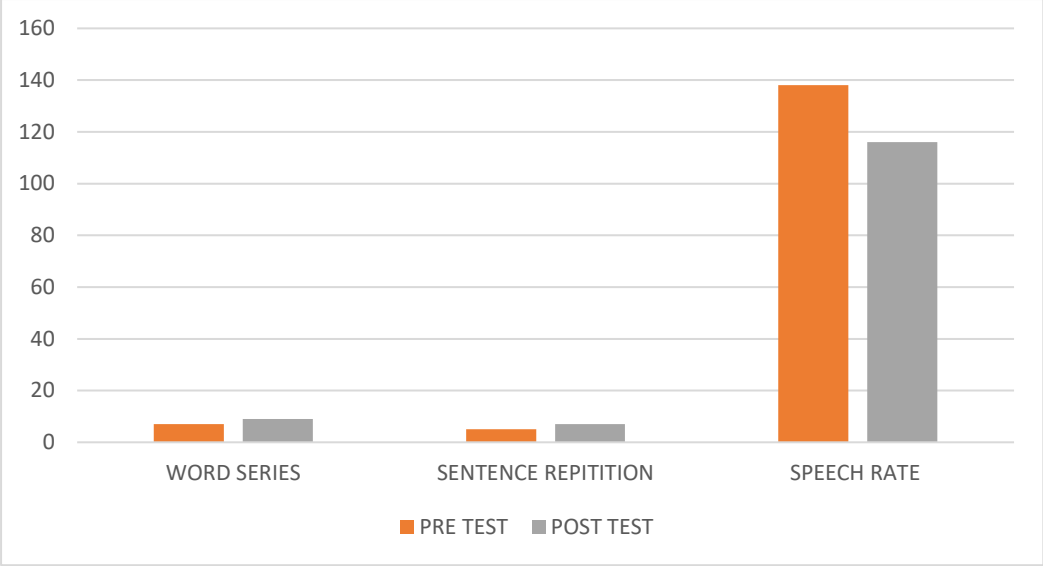

Figure 5. **Bar diagram representing the pre and post test scores on Successive subset.**

The above table& figure represents the difference between the pre and post test scores on successive subset.

4.2 Pre and Post-test Intervention scores of Special Education

Table VI: ***PASS scale standard scores on Special Education***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	40.333	29.569	-1.072	.396
Post-test	47.667	40.698		

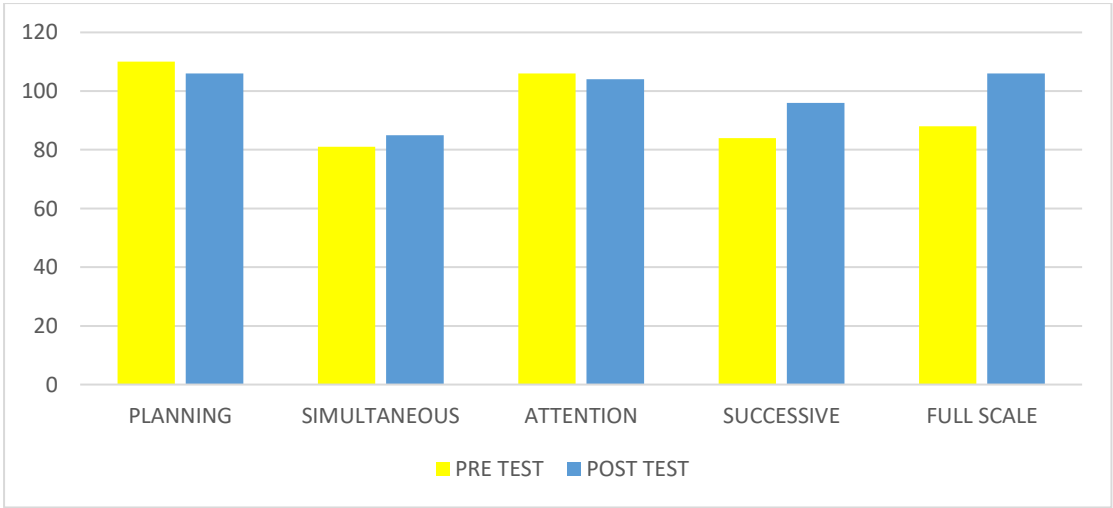

Figure 6. **Bar diagram representing pre and post standard scale scores.**

The above table& figure represents the difference between the pre and post test scores on the four PASS scale subsets. No significant difference was found between the scores.

Table VII: ***Pre and post test scores on Planning subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	93.80	13.274	-1.344	.250
Post-test	99.40	9.044		

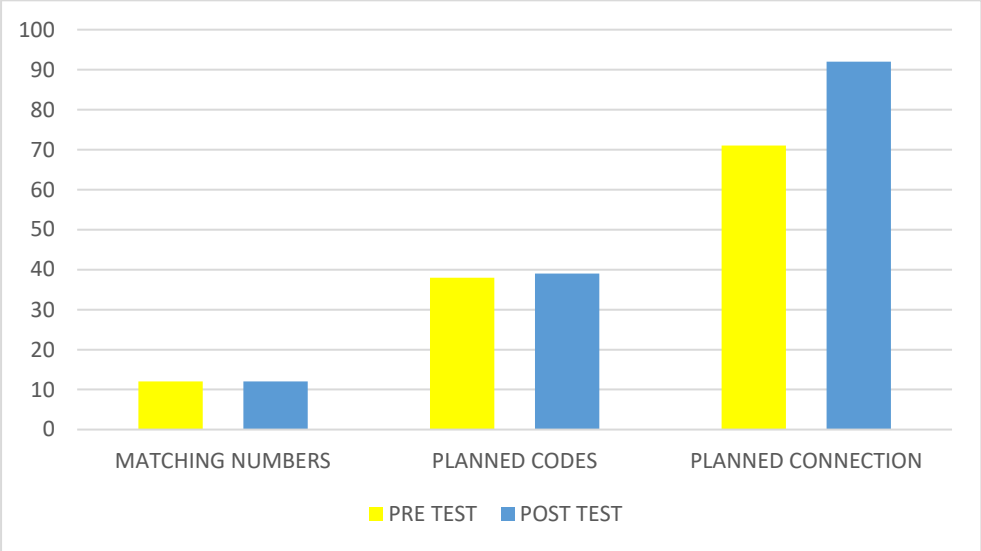

Figure 7. **Bar diagram representing pre and post scores on Planning subset.**

The above table& figure represents the difference between the pre and post test scores on planning subset. No significant difference was found.

Table VIII: ***Pre and post test scores on Simultaneous subtests***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	7.000	4.358	-4.00	.057
Post-test	8.333	3.7859		

****significant at 0.05 level***

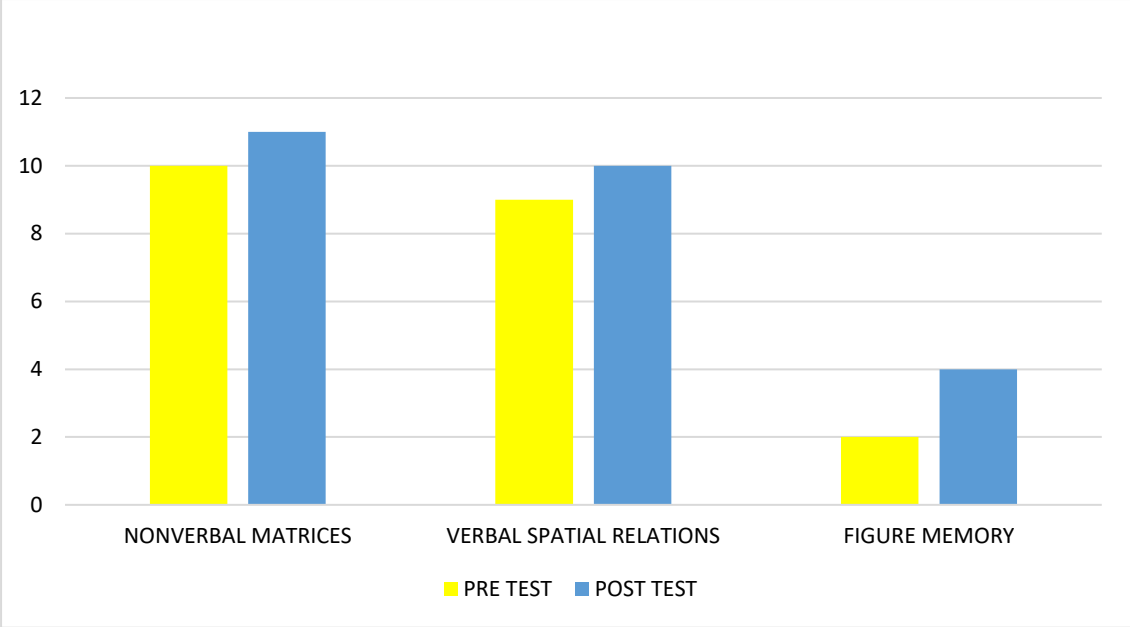

Figure 8. **Bar diagram representing pre and post scores on Simultaneous subset.**

The above table& figure represents the difference between the pre and post test scores on simultaneous subset.

Table IX: ***Pre and post test scores on Attention subset***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	53.667	50.520	.000	1.00
Post-test	53.667	55.985		

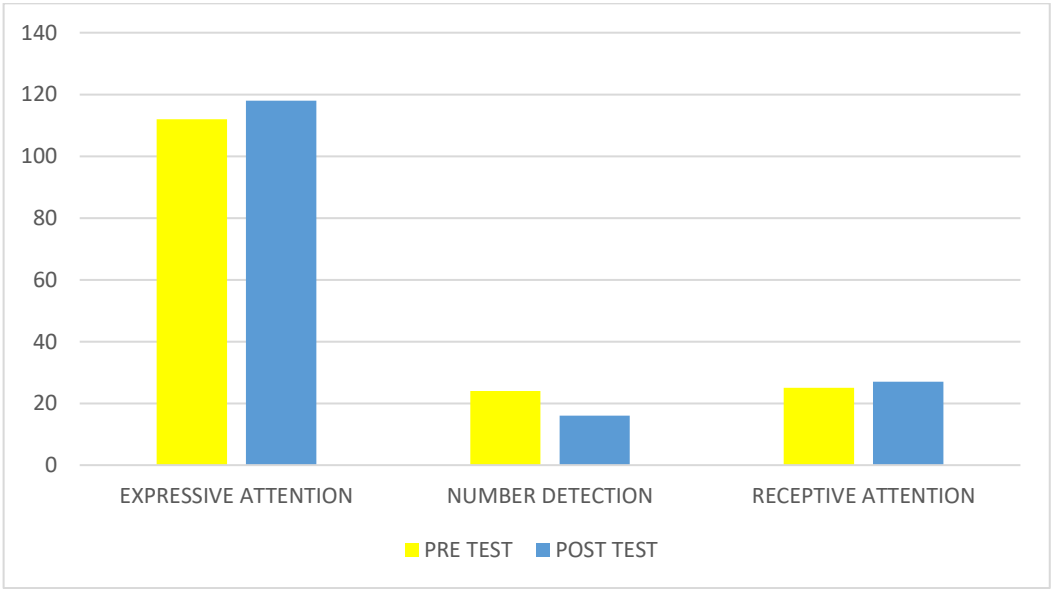

Figure 9. **Bar diagram representing pre and post scores on Attention subset.**

The above table& figure represents the difference between the pre and post test scores on attention subset. No significant difference was found.

Table X: ***Pre and post test scores on Successive subset***

Pre/ Post Test	Mean	S.D.	t	sig (2 tailed)
Pre-test	50	78.822	-2.982	.096
Post-test	54.33	81.119		

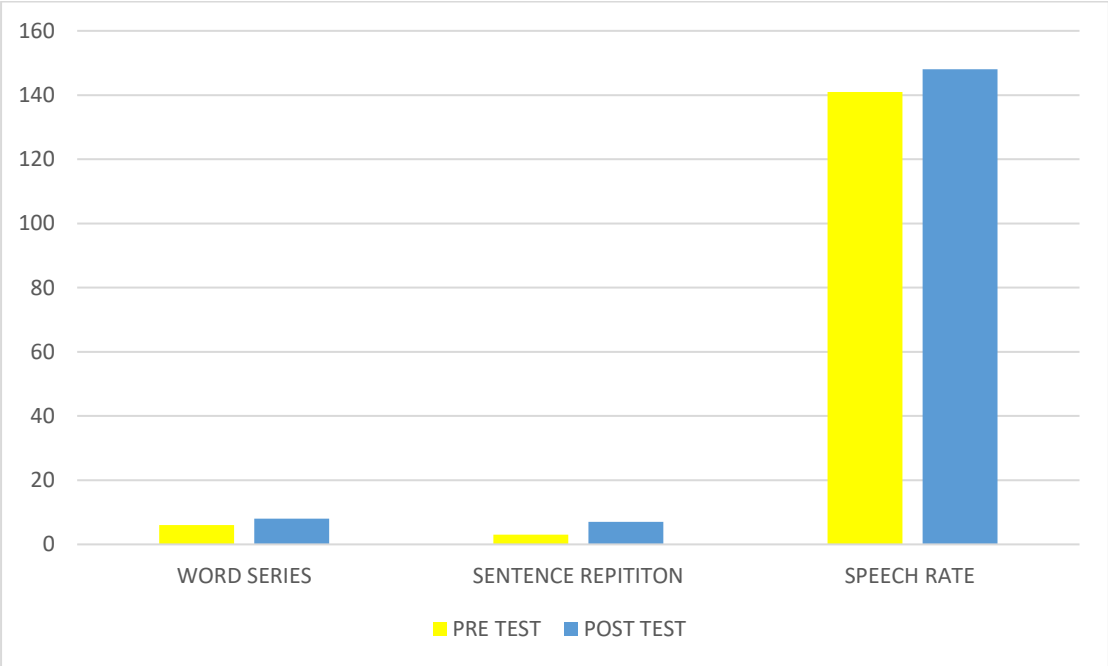

Figure 10. **Bar diagram representing pre and post scores on Successive subset.**

The above table & figure represents the difference between the pre and post test scores on successive subset. No significant difference was found.

5. DISCUSSIONS AND CONCLUSION

The aim to assess the effect of occupational therapy and special education on cognitive processing levels of Children with learning disabilities namely Dyslexia. Children having special needs require added support to help them understand and respond effectively to their surroundings. One approach applied for learning disabilities is occupational therapy and the other is special education. Occupational therapy provides individualised treatment for children facing disabilities and special education provides the time for the child to work on his own pace.The first objective of the study was to assess the cognitive processing level pre and post occupational

therapy intervention. Table A shows a significant difference between the cognitive processing level in pre and post intervention at 0.05 level. The full-scale score increased from low average to average in the post testing. The second objective was to compare the effect of special education on cognitive processing levels of children after a period of one month. No significant difference was found in the pre and post test results of special education intervention as seen from Table B. We found a significant difference in simultaneous processing by both the interventions in the pre and post setting. A significant difference was seen in the simultaneous processing scale was seen.Aligning with our study, Sanghavi, R. (2005) found that occupational therapy did have an impact on visual motor integration of children with learning disabilities. He concluded that occupational therapy can be a useful approach in helping children with learning disabilities. Fang Y (2017) builds upon this, he says there is a relation between visual perception and visual motor integration. The simultaneous processing scale also showed a significant difference in the results of pre and post intervention at 0.05 level for special education intervention as can be seen from Table B.2. The scores pre intervention belonged to low average category and post intervention in the average category. The most difference was seen in the scores of nonverbal matrices and verbal spatial relations. The result on the simultaneous processing scale is corroborated by Filickova, M (2016), they found a significant relationship between reading comprehension and simultaneous processing. Picture comprehension also can assist in the child's writing ability in terms of content, organization and vocabulary. Shamita (2010) also found that reading comprehension did bring some improvement in the simultaneous processing of children. Simultaneous processing is linked to spatial and logical dimensions. It can be said that occupational therapy did bring about a significant difference in the cognitive processing level of the child pre and post intervention. Zimmer, (2012) corroborates with our finding, Occupational therapy and sensory based therapies provide a comprehensive treatment to meet needs of children with learning disability. After analysing the results, we can say that occupational therapy intervention was more significant in bringing about a change in the cognitive processing levels of the children rather than special education. It can be said that a comprehensive treatment plan for children with learning disabilities can provide more consistent results and help them with their performance.

LIMITATIONS OF THE STUDY:

1. The present psychological intervention program is restricted to children already diagnosed with SLD and are not well thought-out for repeated measures.

2. Sample size was relatively small and geographically restricted to one area.

IMPLICATIONS OF THE STUDY:

1. Present findings highlight the significant role of psychological intervention for children diagnosed with SLD, and hence present findings could be introduced in schools or in educational institutions as inclusive approach within the curriculum involved in educating and training the children.
2. Management of educational institutions can make new policies on remedial education program and make the place more inclusive by nature with psychological interventions introduced in the present research.

SUGGESTIONS FOR FURTHER RESEARCH:

1. Similar kind of research may be conducted on children using more psychological variables for instance.
2. Participants across different age and educational levels may be considered to highlight the effect of psychological intervention program.
3. A comparative investigation for psychological intervention of children diagnosed with LD and attending private and public sector remedial schools or institutions.

REFERENCES

[1]. Ciullo, S., Ely, E., McKenna, J. W., Alves, K. D., & Kennedy, M. J. (2019). Reading Instruction for Students with Learning Disabilities in Grades 4 and 5: An Observation Study. *Learning Disability Quarterly*, *42*(2), 67–79

[2]. Filickova, M., Kovalcikova, I. and Ropovik, I. (2016), The role of simultaneous and successive processing in EFL reading

[3]. Friend, M., Cook, L., Hurley-Chamberlain, D., & Shamberger, C. (2010). Co-teaching: An illustration of the complexity of collaboration in special education. *Journal of educational and psychological consultation*, *20*(1), 9-27.

[4]. Georgiou, G. K. and Das, J. (2014), Reading comprehension in university students: relevance of PASS theory of intelligence. Journal of Research in Reading

[5]. Grewal, R. K., Vig, D., & Saini, S. (2014). Role of visual perception in improving quality of handwriting. *Indian Journal of Health & Wellbeing*, *5*(5).

[6]. Joseph, L. M., McCachran, M. E. and Naglieri, J. A. (2003), PASS cognitive processes, phonological processes, and basic reading performance for a sample of referred primary-grade children. Journal of Research in Reading, 26: 304-314

[7]. Keat, O. B., & Ismail, K. B. H. (2010). The PASS cognitive functions of children with reading difficulties: a Malaysian study. *Procedia-Social and Behavioral Sciences*, *5*, 2182-2193.

[8]. Kuriyan, N. M., & James, J. K. Prevalence of Learning Disability in India: Need for Mental Health Awareness Programme.

[9]. Liu, D., Chen, X., & Wang, Y. (2016). The impact of visual-spatial attention on reading and spelling in Chinese children. *Reading and Writing*, *29*(7), 1435-1447.

[10]. Nation, K., Clarke, P., & Snowling, M. J. (2002). General cognitive ability in children with reading comprehension difficulties. *British Journal of Educational Psychology*, *72*(4), 549-560.

[11]. Passer, M. W., & Smith, R. E. (2004). *Psychology: The science of mind and behavior*. McGraw-Hill.

[12]. Sanghavi, R., & Kelkar, R. (2005). Visual-motor integration and learning-disabled children. *The Indian Journal of Occupational therapy*, *37*(2), 33-35.

[13]. Santrock, J. W. (2007). A topical approach to life-span development, 3E. *Ch*, *5*, 192.

[14]. Shamita Mahapatra, J. P. Das, Holly Stack-Cutler & Rauno Parrila (2010) Remediating Reading Comprehension Difficulties: A Cognitive Processing Approach

[15]. Tom Humphries, Maureen Wright, Beth McDougall & Joan Vertes (1990) The Efficacy of Sensory Integration Therapy for Children with Learning Disability, Physical & Occupational Therapy In Pediatrics, 10:3

[16]. Zimmer, M., Desch, L., Rosen, L. D., Bailey, M. L., Becker, D., Culbert, T. P., ... & Adams, R. C. (2012). Sensory integration therapies for children with developmental and behavioral disorders. *Pediatrics*, *129*(6), 1186-1189.

[17]. Yildiz, M., & Çetinkaya, E. (2017). The relationship between good readers' attention, reading fluency and reading comprehension. *Universal Journal of Educational Research*, *5*(3), 366-371.

[18]. Yung, K., Heward, W. L., & Heng, M. A. (2006). A Reading Instruction Intervention Program for English-Language Learners Who Are Struggling Readers. *The Journal of Special Education*, *40*(2), 79–93