Effectiveness of using visualization and verbalization (v/v) technique in reading comprehension skill of children with autism in Bangladesh

Submitted by

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Supervisor's Statement

As supervisors of Syeda Tazkia Sultana MSc Thesis work, we certify that we consider her thesis "Effectiveness of using visualization and verbalization (v/v) technique in reading comprehension skill of children with autism in Bangladesh" to be suitable for examination.

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DECLARATION

- Submission of this assignment acts as confirmation that it is fully my own work and has not been submitted for any other assessment or award.
- I confirm I am submitting ONE PAPER COPY of this assignment and that I have a back-up electronic copy, should this be required.

Date:..... ……

Signature of the Candidate

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled,

"Effectiveness of using visualization and verbalization (v/v) technique in reading comprehension skill of children with autism in Bangladesh"

Submitted by Syeda Tazkia Sultana for the partial fulfillment of the requirements for the degree of M. Sc.In Rehabilitation Science.

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List of Abbreviations

ASD- Autism Spectrum Disorder

CBM- Curriculum Based Measurement

CDD- Childhood Disintegrative Disorder

CELF-5- Clinical Evaluation of Language Fundamentals-5

CI- Confidence Interval

OTs- Occupational Therapist

PDD-NOS- Pervasive Developmental Disorder Not Otherwise Specified

RT- Reciprocal Teaching

SLTs- Speech and language Therapist

V/V- Visualization and Verbalization

Content

Abstract

The main aim of the study is to find whether there is any relationship between visualization and verbalization (V/V) technique and reading comprehension skill among the children with autism. Moreover, the study has conducted to analyze the sociodemographic status of the participants and individual participant's pre and post-performance of applying the technique having the specific objective, to analyze the individual participant's pre and post-performance of applying the technique; to find out the differences in pre and post- performance of reading comprehension skill among the group after applying the visualization and verbalization technique.

Following the objective, the researcher hypothesized that (H_a) there is a positive relationship the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh where the null hypothesis (H_o) is there is no relationship the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh.

The study is a pre and post-test quasi experimental designed study where 8 participants of a special school in Savar, Bangladesh took place in the study. Their age range were from 9-12 years old. Each participant got 8 sessions of 20-25 minutes with applying visualization and verbalization (V/V) technique. Pre and post-test was done with reading comprehension part of Bangla modified version of Clinical Evaluation of Language Fundamentals-5 (CELF-5).

The result showed that each participant has better performance in post-test considering pre-test. On the other hand, paired T-test result showed p value (0.000)< 0.5 so there was a significant positive relationship between V/V technique and reading comprehension skill among the children with autism.

Chapter I

Background of the study

1.1 Introduction: Autism spectrum disorder (ASD) is a neurodevelopmental disorder causes global impairments in verbal and non-verbal communication, social skills and stereotype patterns of behavior and interests. This again causes difficulty in literacy development. Children with autism find it hard to comprehend thoughts, unable to understand feelings of others as well. However, they also show advanced ability in word recognition and reading fluency but severe deficit in reading comprehension. Language and communication deficits are a core feature of autism spectrum disorders (American Psychiatric Association, 2013), which usually extend to impairments in reading comprehension (Nation, Clarke, Wright,&Williams, 2006). These deficits in reading comprehension need early identification and intervention in order to upgrade the impact on academic achievement. There seems to exist a demonstrated discrepancy between expected achievement (based on intellectual functioning) and actual achievement in at least one of spelling and word reading skills in children with autism spectrum disorder (Brown, Oram, Cardy, & Johnson, 2013; Estes, Rivera, Bryan, Cali,&Dawson, 2011). Behavioral studies have reported high-functioning children with ASD having problems with different aspects in higher order processing skills (reading comprehension) including pragmatics, semantics, and phonological processes (Groen et al., 2010; Williams, Botting, &Boucher, 2008), while more basic processing skills (decoding and word identification) remain relatively intact (Norbury & Nation, 2011).

In 2013 a national level study conducted in Bangladesh that has found 1.5/1000 as a prevalence of ASD (Rahman, Akhter, Biswas, Abdullah, 2016). It is a burning issue towards all now a day. Different organizations, institutions are working with this huge number of children with autism. Special needs schools are also established for the children as well. There is no exact list of special schools in Bangladesh but numbers of school are increasing day by day. For a child with any difficulties it is important to continue the treatment e.g. medicine, therapy etc. However

simultaneously schooling is also important that helps the child to improve social skills, literacy levels as well.

Reading comprehension is described as a concern that students deal with all through their education. It is considered the goal of reading. Even adults need to continue to adjust their reading strategies in different tasks. Unfortunately, little instruction in reading comprehension skills is provided in the elementary classrooms (McLaughlin, 2012).

Many research-based strategies were developed to enhance reading comprehension skills especially for students with learning disabilities, specifically reading disabilities. However, some students, even with the implementation of many of these strategies, they can read words, sentences, and text accurately and fluently. They may also have well-developed oral vocabulary, yet are unable to reason, think critically, and interpret. These students do not get the big picture or the imaged gestalt of what they read. These characteristics are often common in hyperlexic children like those diagnosed with Asperger syndrome, a disorder from Autistic Spectrum Disorders (ASDs) (Bell, 2007)

The goal of reading is comprehension, and reading comprehension can be vital for lifelong learning. Students with difficulties in comprehension have trouble with semantics, recalling details, inferences, conclusions and predictions (Sencibaugh, 2007). Teachers often focus on decoding when teaching reading and believe that comprehension will improve as decoding improves. This is true for most students, but not for all. There are students who master the mechanics of reading, but still have low rates of comprehension. These students need to be taught skills and strategies for comprehension.

1.2 Significance of the Study: A number of researchers discussed the importance of visualization and concept imagery in helping students with Asperger Syndrome in reading comprehension skills. The "Visualizing and Verbalizing for Language Comprehension and Thinking" program successfully stimulates concept imagery and improves reading comprehension skills (Bell, 2007) Since reading comprehension is the universe of reading (Bell, 2007), it is very important for the

teachers at all levels, both special education and regular teachers to be well trained in implementing a corrective program that helps students with this disorder improve their comprehension skills. Information resulting from clinical studies have hypothesized that the process of visualization significantly enhances reading comprehension skills especially for students with Asperger syndrome (Bell, 2007). The Visualizing and Verbalizing program is grounded in the evidence that reading requires two codes and not only one. Most comprehension programs only give credence to the verbal or linguistic code. However, according to Paivio (2007), imagery is a silent partner in cognition. Visualization makes it easier for them to process information, organize and store them. In addition, by turning those mental images back into words, the process of verbalization helps in retrieving the stored information and showing understanding. Visualization, or creating mental pictures while reading, is strategy that highly effective readers use. Sousa (2005) states that readers who use this strategy understand and remember what they read better than those who do not. These mental pictures created may include concrete images such as what characters, the setting of the story, and plot events look like. Also, they may include abstract images such as mental maps of locations in the text, webs illustrating the relationships between information or ideas, and visual representations of abstract thoughts.

Reading Comprehension is a concerned issue because the students deal with it all through their education. It is actually can be said as a goal of reading (Fakhreddine, 2013). Many research based strategies has been developed to improve reading comprehension skills especially for the students with learning difficulties, associated with ASD as well. In 1998, Gersten et al. released an extensive review of the literature concerning reading comprehension in children with learning disabilities. In this review, they listed several characteristics of students with learning disabilities that relate to reading comprehension. The first characteristic discussed by Gersten et al. (1998) is a "weakness in knowledge base." A second characteristic of learning disabled students that impacts their reading comprehension is that they commonly have gaps in their own background knowledge that interferes with their ability to comprehend. Gersten et al. (1998) states that students with learning disabilities have greater difficulty picking out the important information from a story. The

fourth characteristic involves a difficulty with applying the strategies themselves, which Gersten et al. (1998) have termed, "problems in strategic processing." Currently, there are many approaches to improving text comprehension in struggling readers. The Nancibell® Visualizing and Verbalizing Program for Language Comprehension and Learning is one of the techniques. This program has a more limited application specifically people with "weak concept imagery." These individuals are able to pick out specific details from a text or a conversation. (Stimley, S. 2006) According to Rader (2010) using language for visualization of words is considered an important tool to help students with autism who usually have difficulties in reading comprehension.

In Bangladesh, different studies are conducted in area of autism but still there is no research have been published in literacy area development e.g. reading fluency/ reading comprehension etc. On the other hand, number of schools, special educators and therapist are increasing day by day. So the researcher found it interests and important to work with the area of reading comprehension skill of children with autism.

1.3 Research question:

The main aim of the study is to find whether there is any relationship between visualization and verbalization (V/V) technique and reading comprehension skill among the children with autism. Moreover, the study has conducted to analyze the sociodemographic status of the participants and individual participant's pre and post-performance of applying the technique. So the study is conducted following the objective

General Objective: To identify the relationship between visualization and verbalization (V/V) technique and reading comprehension skill among the children with autism in Bangladesh.

Specific Objective:

- To analyze the individual participant's pre and post-performance of applying the technique.

- To find out the differences in pre and post- performance of reading comprehension skill among the group after applying the visualization and verbalization technique.

Following the objective, the hypothesis (H_a) is there is a positive relationship the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh where the null hypothesis (H_o) is there is no relationship the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh.

1.4 Operational Definitions:

Children with Autism: Autism is a neurodevelopmental disorder that causes difficulties in communication and social interaction, stereotype behaviors and interests. The children who are diagnosed as Autism by a Speech and language therapist and/or occupational therapist will be considered as a Children with Autism in this study. Autism spectrum disorder (ASD) is a group of disorders that include childhood disintegrative disorder (CDD), Rett disorder, autistic disorder, Asperger syndrome (AS), and pervasive developmental disorder not otherwise specified (PDD-NOS) (Ben- Arieh & Miller, 2009). A common characteristic of all individuals in the spectrum is that they display problems and difficulties in social communication, social interaction, and imaginative thinking (Pittman, 2007)

Reading Comprehension: Reading is such a skill that is needed in education and the reading comprehension can be said as the actual outcome of reading (Fakhreddine, 2013). It can be defined in simple as the skill to truly understand whatever is read. The process of creating meaning from a read text is reading comprehension. Understanding of a specific grade level reading passage as typically measured by the number of questions answered correctly following reading the material. (Schmidt, J 2009)

Visualization and Verbalization: Visualization is the formation of associations and mental images based on previous knowledge (Zwiers, 2004). For instance, visualizing helps students in forming

mind pictures about what they read or heard, storing information, and retrieving them by turning the pictures into words. Visualizing and Verbalizing for Language Comprehension and Thinking (V/V) is a supplemental/intervention program designed to instct and improve reading comprehension, oral language comprehension and expression, written language expression, and critical thinking skills in individuals of all ages through the development of concept imagery forming mind pictures about what they read or heard, storing information, and retrieving them by turning the pictures into words.

1.5 Conceptual Framework:

Independent Variable: Verbalization and Visualization Technique (V/V)

Dependent Variable: Reading Comprehension Skill

Confounding variable: Academic work in class,

This chapter has included the introduction, significance of the study, research questions along with hypothesis, the operational definitions and the conceptual framework. The following chapters will cover the literature review, details methodology used in the study, result analysis, discussion and conclusion along with limitations and recommendation.

Chapter II

Literature Review

Impairments in reading comprehension skills in autistic children and specifically in students with Asperger syndrome are becoming more highlighted in today's literature (Hale & Tager-Flusberg, 2005). Traditionally, teaching reading comprehension for students with ASD has received little importance in research since social and behavioral needs were considered more important (O'Conner & Klein, 2004). However, studies demonstrate a discrepancy between good word identification skills and poor reading comprehension ability in the profile of students with ASD. A study performed by Jones, Happe et al (2009) describes the results of standardized tests to 100 students diagnosed with ASD. The results illustrated discrepancies between word recognition and reading comprehension. The scores on word recognition were very high as opposed to the below average reading comprehension scores.

The same discrepancy between these two skills is found in different studies about reading skills in ASD (Lingren, Folstein, Tomblin, & Tager-Flusberg, 2009). For example, Nation, Clarke, Wright, & Williams (2006) conducted a study on 41 individuals aged 6-16 years with ASD. The results showed that 32 readers had 16 the ability to read fluently and accurately while they scored very low on reading comprehension and nine were not able to read.

Since ASDs students are supposed to be integrated in regular schools and in the mainstream classrooms (NCLB, 2001), it is extremely essential for instruction in reading comprehension to be a crucial component in the curriculum.

Fakhreddine (2013) conducted the study on "Examining the Effectiveness of the Visualizing and Verbalizing Program for Language Comprehension and Thinking© on Two Bilingual students with Asperger Syndrome". The purpose of this case study was to determine the effectiveness of the Visualizing and Verbalizing for Language Comprehension and Thinking© by Nancibell on two upper elementary students diagnosed with Asperger Syndrome, one of the autism spectrum

disorders (ASDs). Another aim was to identify the changes in the students' attitude and motivation throughout the intervention. The results showed that the program significantly improved the reading comprehension skills of the students who were exposed to the intervention, and they developed a more positive attitude and increased motivation towards tasks that require reading comprehension.

Sencibaugh's (2007) meta-analysis of comprehension programs for students with learning disabilities found that any type of metacognitive comprehension strategy instruction helped to increase reading comprehension scores. The Report of the National Reading Panel (2000) found three areas essential for comprehension: vocabulary development, active process of making meaning and engaging in thinking processes while reading including making mental pictures, and teacher preparation to teach strategies. Strategies that have a solid research base to improve comprehension are self-monitoring, cooperative learning of strategies, graphic and semantic organizers, question answering with immediate feedback, generating questions, teaching story structure, and summarization.

Two instructional approaches for comprehension were compared in a study by Manset-Williamson and Nelson (2005). Upper elementary and middle school students with reading disabilities received reading interventions for one hour a day for a total of 20 hours. Students received identical decoding and fluency instruction, but different comprehension instruction. In the first method, strategies were modeled for students, and then students had guided practice with strategies. The second method used more explicit teaching. Students were taught strategies in sequence with a mnemonic. Both groups made significant gains, and the group using the explicit method made greater gains. The authors noted concerns with the high level of teacher direction necessary with the more explicit method, possible lack of spontaneity for creating own strategies, and time and labor intensiveness for readers.

In another study, second grade students with low listening comprehension received visualization training for reading comprehension (Center, Freeman, Robertson, & Outhred, 1999). Teaching

visualizing, or making mental pictures, while reading can help students remember, make inferences, and make predictions (Sadoski, 2005). Students who received the training had greater scores on listening and reading comprehension than the control group. The study supports the use of visual imagery training to improve reading comprehension.

Joffe, Cain, and Marie (2007) also used visual imagery training to improve comprehension of stories for students with speech and language impairment. The students in the training made improvement in story memory and literal detail. Through fifth grade students received training in comprehension.

In a study by Johnson-Glenburg (2000). These students were average decoders, but below average in comprehension. The authors compared a verbal based strategy with a visual based strategy to improve comprehension. The visual strategy used was V/V (Bell, 2007). Both groups made significant gains on 11 different measures after the intervention, and the control group only made one significant gain. The verbal strategy group grew more in answering open-ended questions from the text, otherwise growth was statistically similar. Reading comprehension can be enhanced with strategy instruction, and visual imagery instruction for comprehension has seen positive results.

In a study that began in 1997, Lindamood-Bell Learning Processes worked with Pueblo School District 60 in Colorado to improve reading scores. The Lindamood-Bell intervention was implemented over six years and grades three through five achievement results were analyzed. Students received LiPS (5%), Seeing Stars (69%), and V/V (26%). The students in Pueblo had higher achievement in reading comprehension than comparable schools in Colorado according to the Colorado Student Assessment Program that tests reading comprehension. Achievement increased over each year of the study, and students moved unsatisfactory and partially proficient scores to proficient and advanced scores (Sadoski & Willson, 2006). The research finds that using the Lindamood Processes as a reading intervention can foster improvement in reading skills including reading comprehension in a school district. The third through fifth grade students had higher scores on the reading comprehension assessment than students in comparable schools in

other Colorado districts. The Lindamood-Bell reading interventions have proven results in a large-scale district implementation.

Resource room instruction for students with reading disabilities was investigated by Bentum and Aaron (2003). They found that students did not show word recognition or reading comprehension skill improvement. Instruction provided in the resource room did not have significant effect on reading skills at all, and spelling skills actually declined over a three-year period. The authors surmised that lack of progress was due to the lack of a systematic approach to teach students in resource rooms. This study suggests that a need for a different method of reading instruction than traditional resource room instruction is necessary to improve reading for students with learning disabilities. The component model of reading intervention for struggling readers is a method that has demonstrated benefits.

A study of the V/V program (Lindamood et al, 1997) was conducted in a school in Long Beach, California with 2 classrooms of 4th graders. One class served as the control group and the other group received approximate small group training sessions over a 3-month period. Although the student instructed with the V/V program experienced improvement in reading comprehension on the GORT-III that was significantly greater than that experienced by students control classroom, this study suffers from a confound between teacher and program effects. Since only one teacher taught the control students and one teacher taught V/V students, differences in outcomes between groups may have been due to simple teacher differences, rather than instructional program differences.

In another study (Johnson-Glenberg, 2000) students from 3 schools were randomly assigned to one of two treatment groups, V/V or Reciprocal Teaching (RT). Both interventions were taught at all 3 schools by the two trainer. Eligible students were included according to the following criterion: identification by their classroom teachers as being good decoders, but poor comprehends, WRAT (Jastak & Jastak, 1978) grade equivalent score greater than or equal to the grade o the student and a Gates-MacGinitie (MacGinitie & MacGinitie, 1989) comprehension percentile score

below the mean. There were 59 students who fit this profile. The students were then divided into small groups of 3-5 students taking grade and condition into account. Intervention training lasted approximately 10 weeks with minute sessions a week. Both groups received about 28 sessions. Students from 2 other schools formed the quasi experimental control group and based on teacher report received reading comprehension instruction on summarizing (67%), predict (33%), and visualization (17%). There were no significant differences at pretest, but there was a significant difference in vocabulary, with the V/V group being lower. In the analysis of the post test scores, the vocabulary measure was included as a covariate when appropriate. Results indicated that students in the RT group scored significantly higher than the control group on word recognition, question generation, explicit open-ended questions, implicit open-ended questions and visual open-ended questions. The RT group scored significantly higher than the V/V group on question generation, explicit open-ended questions, and listening recall-expository. The students in the V/V group scored significantly higher than the control group on word recognition, implicit open-ended questions, and visual open-ended questions. Significant differences were noted among the 3 groups on measures of GatesMacGinitie comprehension, predictions, miscues, time, recall-proportion of ma recall-details, DTLA-following directions (Baker & Leland, 1959), Working Memory Linguistic Processing, WISC-Digit Span, Paper folding, and visual imagery-paired. Thus, although the interventions produced a mixed pattern of improvements relative to the control group on some of the listening comprehension and strategy use questions, neither intervention produced significant improvements relative to the control on a standardized measure of reading comprehension.

Chapter III

Methodology

This chapter is going to discuss about the details of the methodology used in the study. The study was conducted through pre and post-test quasi experimental method to find out the differences of the performance of the participant after applying the visualization and verbalization V/V technique. One special school from Savar, Bangladesh area was selected as the study place with having the permission from the authority.

Before conducting the study to avoid the double blindness the researcher at first chose one speech and language therapist working over there to provide training on visualization and verbalization technique. Researcher herself provide the basic of the technique, how to apply, materials etc. Trainee was instructed to provide the technique in therapy session for 20-25 minutes. On the other hand, two special educators from the special school were selected to collect pre and post test data from the participants.

Inclusion criteria of the participants was selected as - children with autism diagnosed by therapist (SLT and/or OT); age over 8 years and can read by themselves. Because according to Shiply (2002) in normal developmental milestone at the age of 6 children started to reading and within 7 their comprehension develops. As the participant of the study has delay development as per their condition so 8 years is considered as the marginal age.

Considering the criteria there were 11 populations in the selected study place. Among them 8 were participated and other 3 denied to participate in the study. Here need to mention that due to pandemic situation at that moment it was not possible to choose another school or more participants for the study. So in the study there was only experimental group and no control group.

As data collection tool for reading comprehension, Bangla modified version of Clinical Evaluation of Language Fundamentals-5 (CELF-5; reading comprehension part) was used. There were 9 questions to answer after reading a small story/ paragraph. Correct response for each question

added 1 point and 0 for incorrect response of the participants. Participants were supposed to read the given paragraph and then answer verbally of 9 questions. It took around 10-15 minutes for each participant to collect the data. One special educator was selected to collect only pre-test. Another special teacher was done the post test of applying the v/v technique. Post test data was collected though online with the help of parents of the participants due to unavoidable condition (Covid-19 pandemic)

Participants were given 8 sessions for 20-25 minutes applying visualization and verbalization technique. It took around six months to complete all of the participants' session. Here again need to mention that due to pandemic situation online therapy session was given as alternative way as there were no other options.

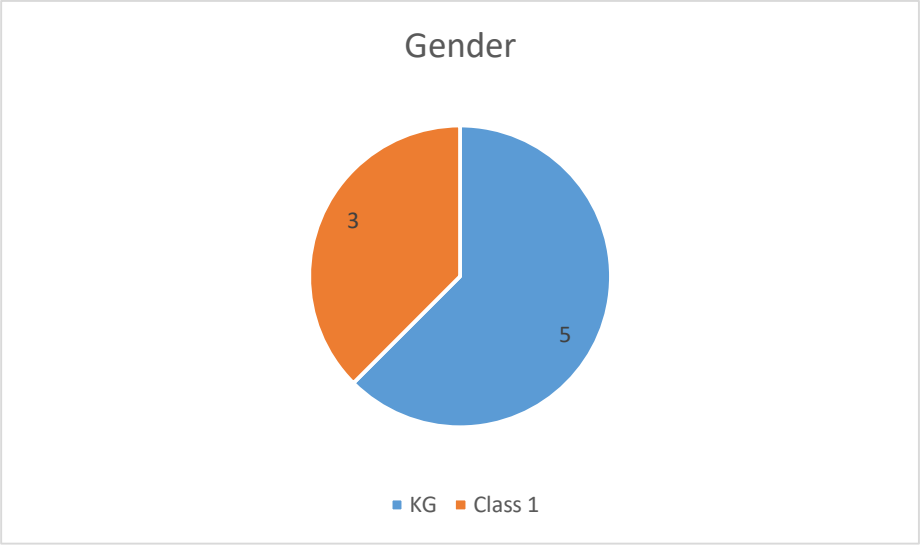
After having all the data through online, the researcher analyzed through SPSS 16 version. For analyzing the individual participant's pre and post-performance (specific objective 1) researcher has used bar chart and graph line. To find out the differences in pre and post- performance of reading comprehension skill among the experimental group (specific objective 2), paired T-test was done. Besides pie chart and bar char has used to analyze the socio-demographic status of the participants.

Chapter IV

Result Analysis

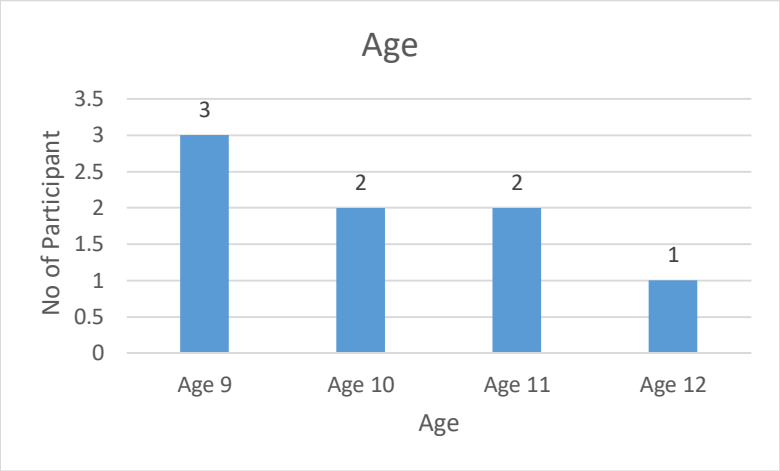
This chapter is going to analyze the result found from the data. Basically three part is here- sociodemographic data analysis, individual participant's pre and post test result analysis (Specific objective 1) and the pre and post-test result analysis among the group.

Socio-demographic status:

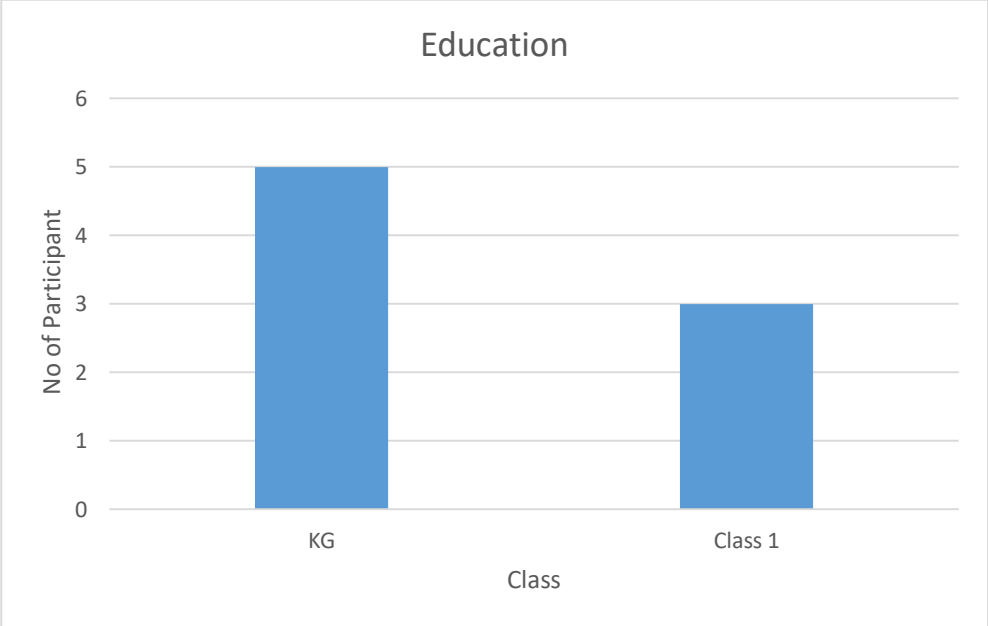


The pie chart shows the result of gender distribution of the 8 participants of the study. Among the 8, 5 were male and other 3 were female participants.

Along with the gender the below chart shows the age distribution of the participants. Participants



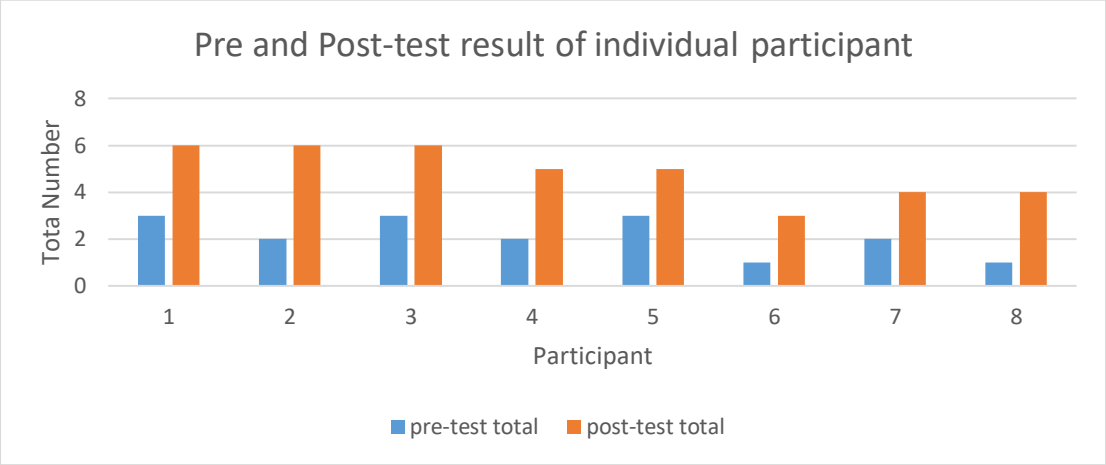
age range was from 9 years old to 12 years old. Three of the participants were 9 years old and one of them was 12 years old. Other four were 10 and 11 years old having the ratio 2:2.



This chart is showing the educational status of the participants. Among 8 participants 5 were studying in kindergarten (KG) and other 3 were in class 1.

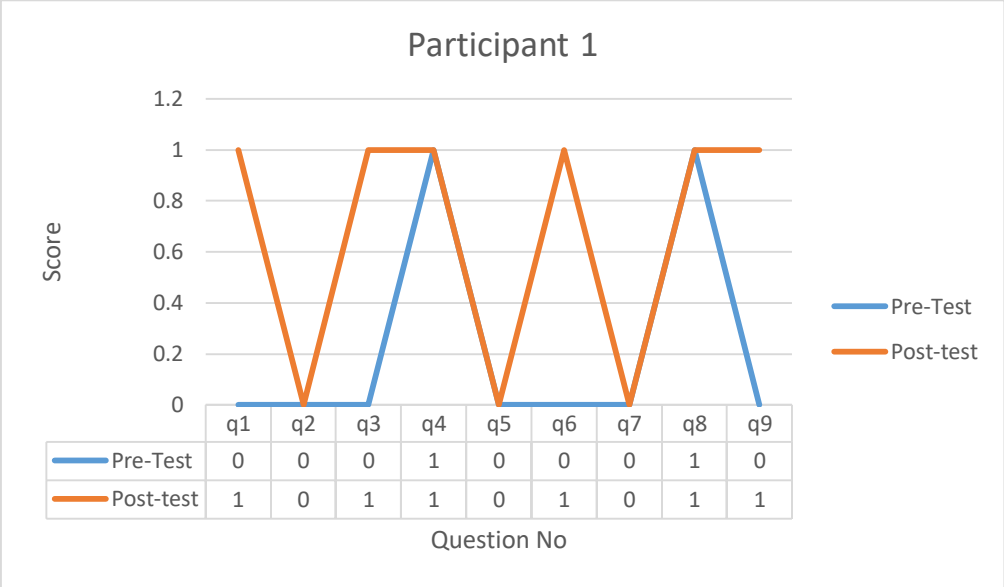
Individual participant's pre and post-performance of applying the V/V technique:

As mentioned before in methodology chapter the questioner included 9 question. For each correct response participant got 1 point and for incorrect response 0.

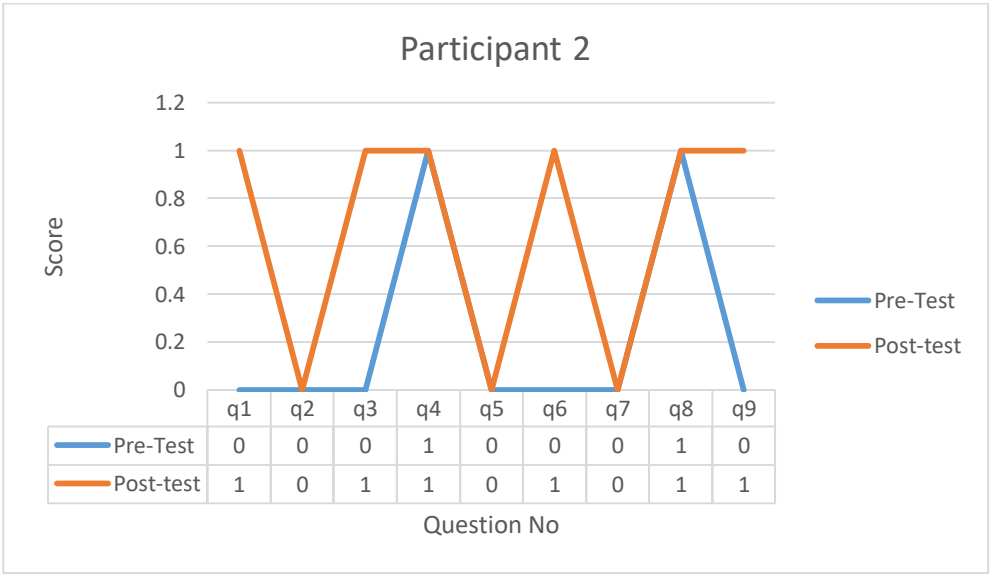


This chart is clearly showing that each participant had better performance in post-test rather than pre-test total.

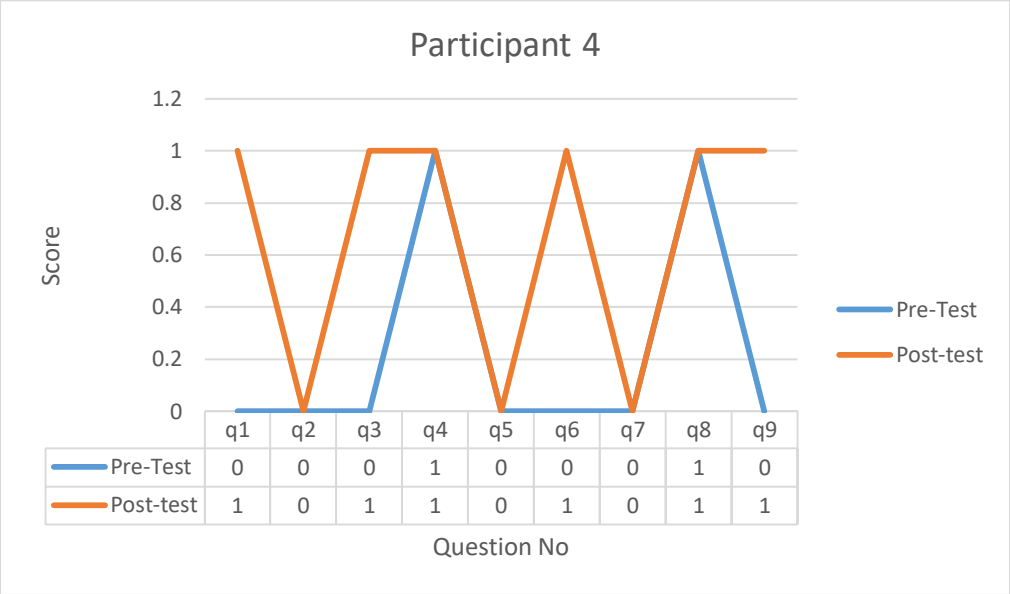
At this point if we are looking for the performance of individual participant's according to the questions, we can see in the below graphs that not all of them were consistent in performance. Participant 1, 2, 4, 6, 7 and 8 have consistent correct response considering pre and post-test that means which answer thy gave correct in pre-test, they were correct in post-test even besides other correct responses given after applying the V/V technique. E.g. participant 1 has got 1 (correct) number in question no 8 in both pre and post-test besides having 1 (correct) number in q 1, 3, 4, 6. 9 in post-test.



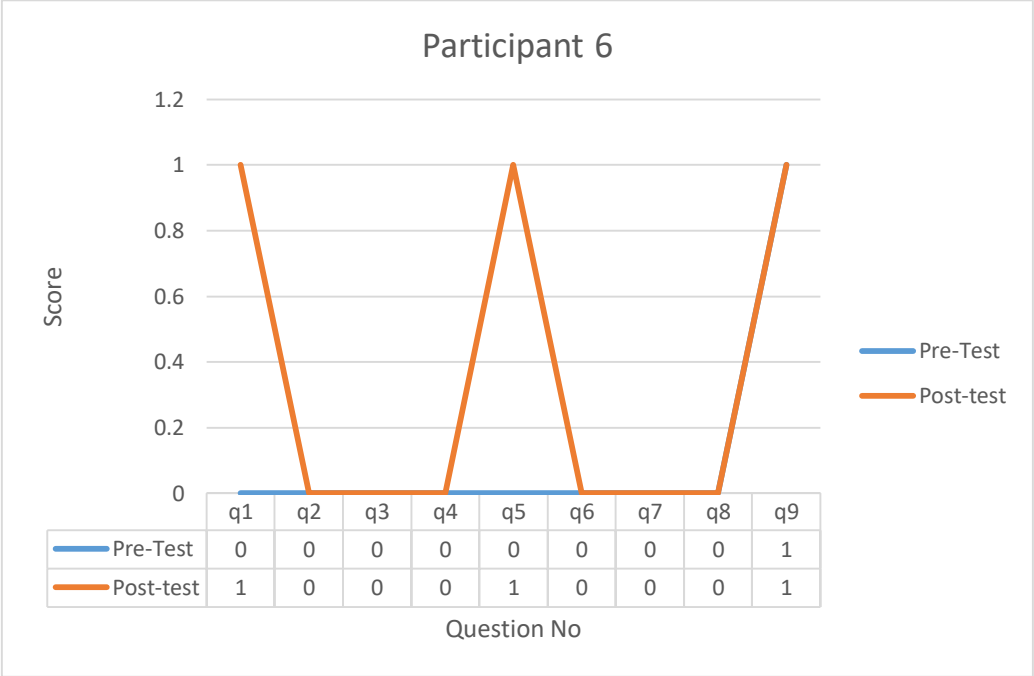
	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	1	0	0	0	1	0
Post-test	1	0	1	1	0	1	0	1	1



	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	1	0	0	0	1	0
Post-test	1	0	1	1	0	1	0	1	1

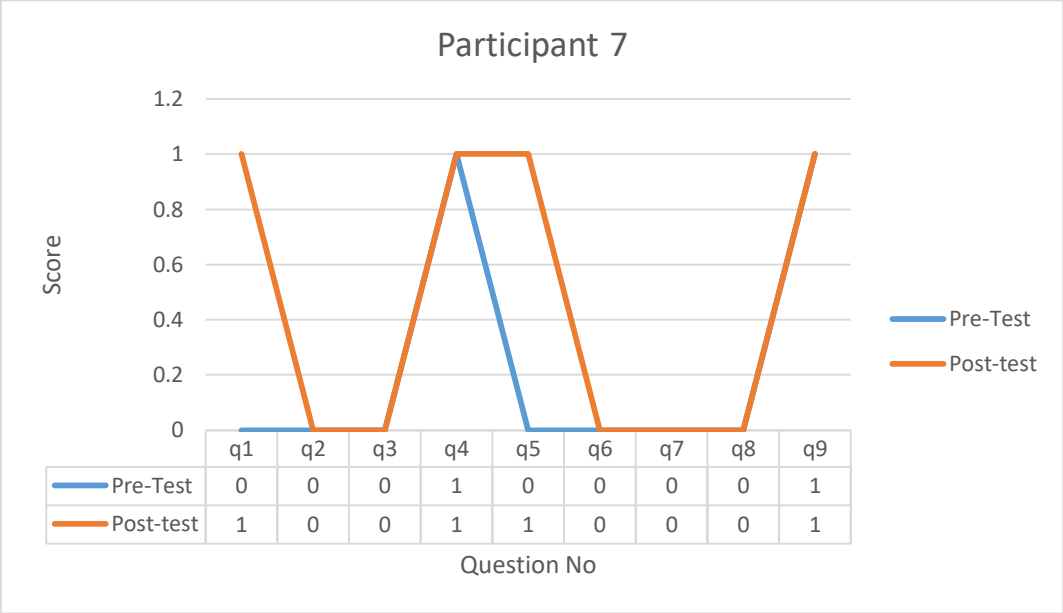


	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	1	0	0	0	1	0
Post-test	1	0	1	1	0	1	0	1	1

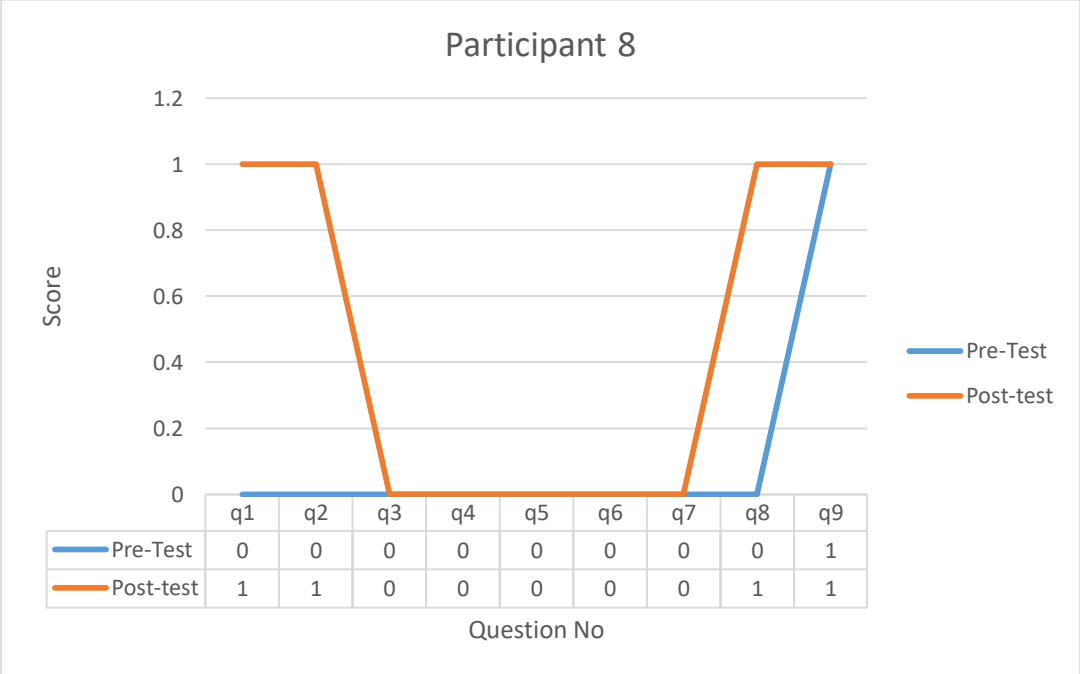


	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	0	0	0	0	0	1
Post-test	1	0	0	0	1	0	0	0	1

Here in participant 4 we can see the similar e.g. he/she got number 1 in both pre and post-test at q 4, 8. Similar has seen in participant 6 in q 9.



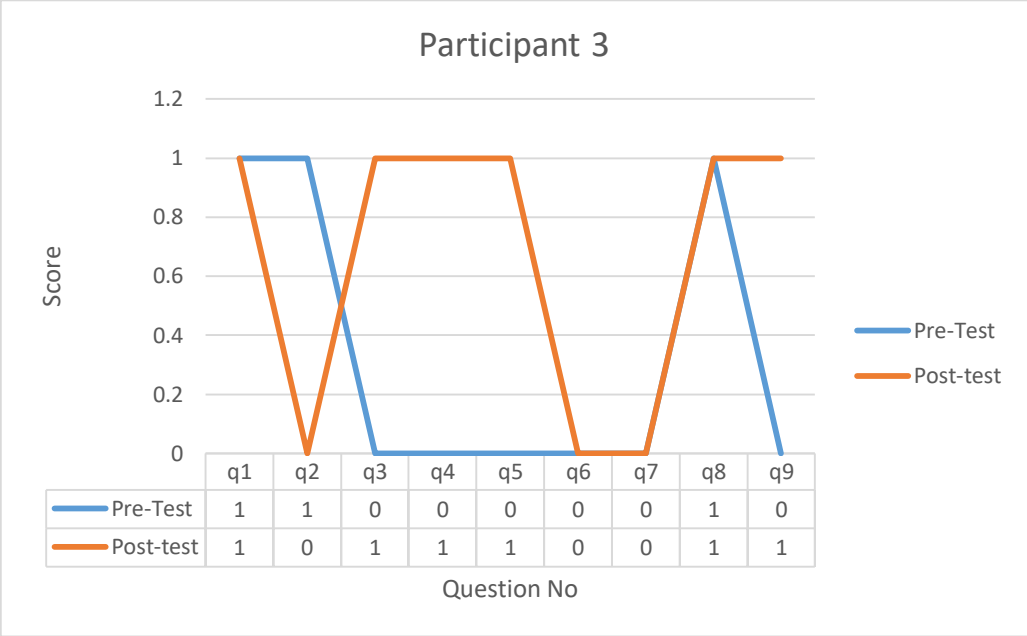
	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	1	0	0	0	0	1
Post-test	1	0	0	1	1	0	0	0	1



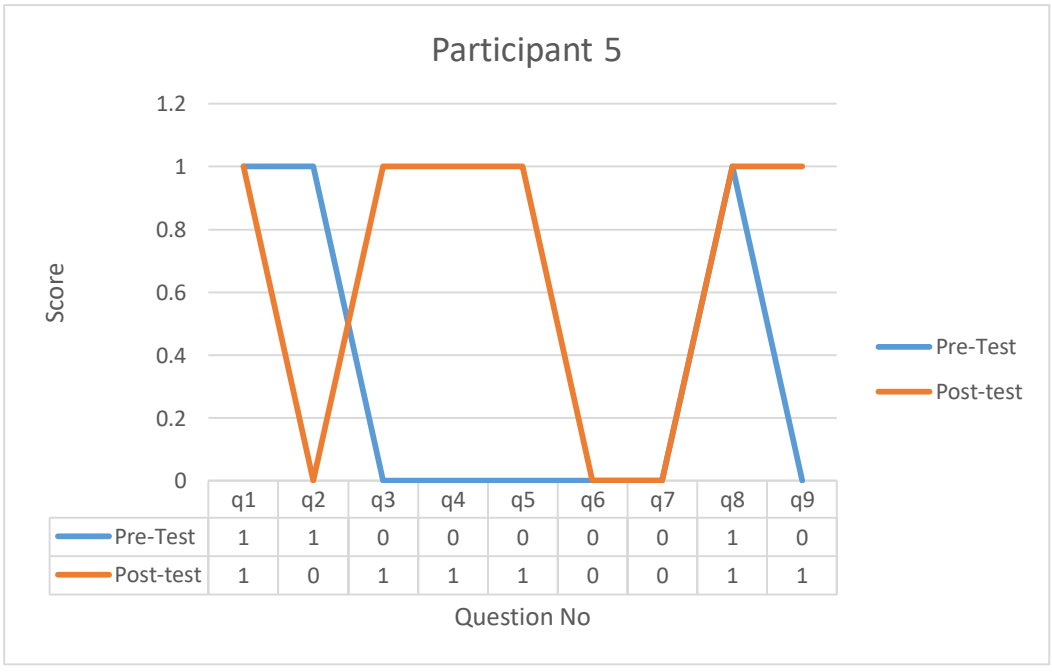
	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	0	0	0	0	0	0	0	0	1
Post-test	1	1	0	0	0	0	0	1	1

Participant 7, 8 is showing the similar as previously mentioned. Both of them were consistent in giving correct response in post-test considering pre-test response.

On the other hand, the case is different in participant 3, 5. They were not consistent in giving correct response in individual question. E.g. in case of participant 3 he/she responded correct in q2 in pre-test where he responded incorrect in same question in post-test.



	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	1	1	0	0	0	0	0	1	0
Post-test	1	0	1	1	1	0	0	1	1



	q1	q2	q3	q4	q5	q6	q7	q8	q9
Pre-Test	1	1	0	0	0	0	0	1	0
Post-test	1	0	1	1	1	0	0	1	1

Here in case of participant 5, got number 1 (correct) in q 2 at pre-test where number 0 (incorrect) in same question at post-test.

Differences in pre and post- performance of reading comprehension skill among the group after applying the V/V technique:

To find out the differences between the pre and post- performance paired sample t-test were done as mentioned in methodology chapter. The researcher hypothesized that (H_a) there is a positive relationship between the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh where the null hypothesis (H_o) is

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretesttotal - posttesttotal	-2.750	.707	.250	-3.341	-2.159	-11.000	7	.000

there is no relationship the visualization and verbalization (V/V) technique and reading comprehension skill of the children with autism in Bangladesh.

The result is showing that having 0.707 std. deviation and considering 95% confidence interval (CI) of the differences, the t value is -11.000 and p value is 0.00 which is less than 0.05. (p value 0.00< 0.05). So it can be said that null hypothesis (H_o) is rejected and alternative hypothesis (H_a) is accepted means there is significant positive relationship between the V/V technique and reading comprehension skill.

This chapter presented the results of all the assessment tools used in the study. This coming chapter includes a discussion of all the results obtained from this research and also it relates the results to previous conducted research and findings.

Chapter V

Discussion

The main aim of the study is to find whether there is any relationship between visualization and verbalization (V/V) technique and reading comprehension skill among the children with autism. Moreover, the study has conducted to analyze the sociodemographic status of the participants and individual participant's pre and post-performance of applying the technique. This section discusses the results and the findings of the study and also relates them to some previous research.

Result showed that individual participant had better performance in post-test rather than pre-test. On the other hand T-test result showed that there is significant positive relationship between the V/V technique and reading comprehension skill.

Similar studies had done by Fakhreddine (2013) entitled examining the effectiveness of the visualizing and verbalizing program for language comprehension and thinking© on two bilingual students with asperger syndrome. The purpose of this case study was to determine the effectiveness of the Visualizing and Verbalizing for Language Comprehension and Thinking© by Nancibell on two upper elementary students diagnosed with Asperger Syndrome, one of the autism spectrum disorders (ASDs). Another aim was to identify the changes in the students' attitude and motivation throughout the intervention. Progress in reading comprehension skills was monitored using the curriculum-based measurement (CBM) before, during, and after the intervention. The intervention took place over a period of four weeks at the rate of ten sessions per week. The researcher compared the results of two students in the experimental group who were exposed to the program

with two ASD peers in the control group who were not exposed to any intervention. The results showed that the program significantly improved the reading comprehension skills of the students who were exposed to the intervention, and they developed a more positive attitude and increased motivation towards tasks that require reading comprehension. It resulted that the pretest and posttest show that both participants who were exposed to the intervention program, made a significant progress in their scores. However, the students in the control group who were not exposed to any intervention did not make any significant improvement. The results of their posttests show that these students are still facing severe difficulty in reading comprehension. The comparison made using the T-test between the results of the experimental and control students shows a significant difference between their results. The results show the importance of the V/V program in improving reading comprehension skills of students with Asperger Syndrome.

Jose et al. (2017) had findings of improved reading comprehension in the ASD experimental group compared to the ASD control group as a result of V/V intervention emphasizes the effectiveness of this intervention as well as the importance of targeted, behavioral interventions for children with developmental disorders. A previous study that used the same intervention with children with dyslexia also found a significant intervention-related improvement in their reading comprehension abilities as measured by the GORT-3 (Eden et al., 2004). The effect of the V/V intervention on reading comprehension skills adds to the already well established potential of behavioral intervention effects on neural correlates leading to a better outcome for children with ASD (Ventola, Oosting, Anderson & Pelphrey, 2013).

Schmidt (2019) conducted hid study where the purpose was to determine the effectiveness of a school wide reading intervention for students with learning disabilities and without learning disabilities. Students who were reading below grade level took part in a Lindamood-Bell reading intervention (V/V technique) in a small group setting. They received instruction for one to two hours daily, ranging from 50 hours to 437 hours per student. General education and special education intervention students' growth scores on pre-intervention and post intervention assessments were compared to each other, as well as to all students in the grade level to determine

the effectiveness of the intervention. Over the two-year span of the study, the intervention group students in general education had an average fluency growth of 56 words and students in special education had a gain of 54 words with grade level fluency screens. When evaluated on grade level comprehension on a scale of one to ten, growth was an average of 1.9 points for intervention students in general education and 1.8 points for students in special education. State testing language arts raw scores for intervention students in general education went up an average of 31 points and students in special education saw an increase of 29 points. Although intervention students in general education consistently have slightly higher growth scores, students with and without learning disabilities improved in reading comprehension, fluency, and state test language arts scores.

Rader (2010) developed a two-year pilot program to find out whether the increase in visualization leads to effective reading comprehension in students with Asperger Syndrome and language delay. Sixty-nine students in lower elementary classes took part in this study; 33 were exposed to the intervention, while 36 were not. The results of the study show that the development of the visualization skill is very effective in improving reading comprehension. It was obvious that students had more detailed and well-structured summary of the paragraph after receiving the program.

Denton, Fletcher, Anthony, & Francis (2006) found that students with severe reading impairments can be helped with systematic and intensive reading interventions and students with learning disabilities may need either more time, further intensive interventions, and may be harder to remediate. The students in this research were 85% English language learners and may not have been students with severe reading impairments, but were students who were below grade level in reading. These students were not growing in reading levels at the rate of their classmates previous to the intervention. The second grade cohort made a four-point growth in comprehension which was significantly greater than the rest of the grade level's .4 point growth. The third grade cohort made progress with 2.3 points, but not as much as the rest of the grade level's 2.9-point growth in comprehension. In the fourth grade cohort, students in the intervention had a decreased

comprehension score by 7, while grade level peers' comprehension increased by .3. This is possibly due to the students missing grade level comprehension instruction.

Schwanenflugel et al. (2006) found that students in first through third grade who had better word reading skills had better reading comprehension but, as students get older, the relationship between fluency and comprehension was diminished. This research also saw an improvement in comprehension aligned with reading fluency in the early grades that was not as apparent in the fourth grade cohort. The research supports early grade reading interventions for word reading skills and the greater importance in adding comprehension instruction in the later grades when increased fluency does not result in as great an increase in comprehension. Because of the component model approach in this intervention model, students did receive comprehension instruction, but generally only if and when their fluency was approaching grade level and comprehension was below their fluency. Student hours in the Seeing Stars (Bell, 1997) decoding and word reading section of the intervention were three times what they were in the Visualizing and Verbalizing (Bell, 2007) comprehension section of the intervention.

Chapter VI

Conclusion

Autism spectrum disorder (ASD) is a neurodevelopmental disorder causes global impairments in verbal and non-verbal communication, social skills and stereotype patterns of behavior and interests. This again causes difficulty in literacy development. Children with autism find it hard to comprehend thoughts, unable to understand feelings of others as well. However, they also show advanced ability in word recognition and reading fluency but severe deficit in reading comprehension. Reading comprehension is described as a concern that students deal with all through their education. It is considered the goal of reading. Even adults need to continue to adjust their reading strategies in different tasks. Many research-based strategies were developed to

enhance reading comprehension skills especially for students with learning disabilities, specifically reading disabilities. The "Visualizing and Verbalizing for Language Comprehension and Thinking" program successfully stimulates concept imagery and improves reading comprehension skills. Visualization is the formation of associations and mental images based on previous knowledge where the process of verbalization helps in retrieving the stored information and showing understanding.

The study was conducted with the aim of finding whether there is any relationship between visualization and verbalization (V/V) technique and reading comprehension skill among the children with autism. Moreover, the study has conducted to analyze the sociodemographic status of the participants and individual participant's pre and post-performance of applying the technique. Result showed that there is significant positive relationship between the v/v technique and reading comprehension skill among the children with autism. After completion of the study researcher sort out some limitations of the study and have some recommendation for further studies.

Limitations:

- Pandemic situation was a big limitation for conducting the study. It may affect to apply the therapy technique which impacts on the result positively or negatively.
- The study just took place in a small area of the country that does not represent the whole picture.
- Without having control group, it is really difficult to bring a conclusion of the effectiveness of therapy techniques.
- Having the confounding variable (academic work relates with reading comprehension) was another limitation of the study.
- Lack of available literature was another limitation of this study.
- Lack of therapy materials of applying the technique was a limitation.
- Less number of participants and limited study place is another limitation.

Recommendations:

The study result showed a significant change in performance of the participants after having the therapy session. It will be highly appreciated if the study can re-conduct with having control group and increased number of participants. Parents perception and attitudes towards the performance of their children after having the therapy technique, can be observed and analyzed through qualitative method. Effectiveness of the v/v technique can be observed in other conditions having learning disabilities. Not only the reading comprehension, but also other modes of reading e.g. fluency, vocabulary etc. can be influenced by the technique as mentioned in the manual so those areas can be observed and analyzed even. Finally it can be recommended that this visualization and verbalization (V/V) technique should be analyzed, modified and applied in our country context as we have very poor resources.

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