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Effect of Literacy-Rich-Approach in the Generalization and Maintenance of Reading Comprehension Skills in Children with Intellectual Disability

Mary Varkey Pallikudiyil[1*], Sukumaran Subramanian Ponath[2]
[1]*Associate Professor, Department of Special Education, Nirmala Sadan Training College for Special Education, Muvattupuzha, India*
[2]*Professor, School of Behavioural Sciences, Mahatma Gandhi University, Kottayam, India*
*Corresponding author: sistergloryfcc@yahoo.com

***Abstract*: The study investigates the effectiveness of Literacy-Rich-Approach (LRA) in the generalization and maintenance of reading comprehension skills in children with Intellectual Disability (ID). Sample consisted of 60 students with mild level Intellectual Disability (30 experimental 30 control) from special school. Pretest - post test - control group design was used. The study was done in three stages. (I) Pretesting stage, (II) Intervention stage using LRA (III) Post intervention stage. In stage III, the parallel test (to measure acquisition), the post test (to measure generalization), and retention test (to measure maintenance) were administered. Analysis of Covariance ANCOVA) was the major statistical technique employed for testing hypothesis. The result showed that LRA was effective for generalization and maintenance of reading comprehension skills in children with ID.**

***Keywords*: Generalization, Intellectual disability, Literacy-Rich-Approach, Maintenance, Reading comprehension.**

1. Introduction

Reading ability is one of the important instrumental behaviors of human being. To become independent one should learn to read. Without reading it is very difficult to live in the modern world which has all technological developments and their practical applications. A lack of reading limits one's quality of life (Braford, Shippen, Alberto, Houschins & Flores, 2006).

The most fundamental job of education system is to teach children to read. For normal school age population, failure to read restricts them to acquire knowledge in more than one school subject because proficiency in Math, English or Social Studies depends on the ability to read. They will be delayed in language acquisition, general knowledge, vocabulary and even social acceptance (Mahlburg, 2013). Reading is a skill very much related to student's self-concept. Proficiency in reading will help to avoid experiences that result in diminished self-worth.

Reading comprehension is the ultimate goal of reading process. It is constructing meaning by integrating the information provided by the author with reader's background knowledge. It requires that reader interact with the text to construct meaning. In other words reading comprehension is the mind's ability to understand the ideas in the text and the message and purpose of the author (Flores, Moran, & Orzo, 2004). Rubin (1997) observed reading comprehension is a complex intellectual process involving a number of abilities. Two major abilities involve word meaning and verbal reasoning. Without word meaning and verbal reasoning there will be no reading comprehension.

Like all persons, successful progress in literacy is crucial for children with intellectual disability. Therefore, their teachers should give first priority in reading skill development. When it comes to instruction of reading comprehension to children with ID, one finds it difficult. Literature on reading comprehension of children with intellectual disability conveys mixed findings. Carter (1975) noticed that of various aspects of reading, comprehension appears to be most difficult for them. Westling (1986) reported that reading is generally considered the weakest area of learning, especially comprehension. Carney (1979) reported child with mild ID can achieve a level of literacy commensurate with their mental ages, if instruction is designed specially to meet the child's individual needs. Algozzine and wood (1994) argued that instruction for students with ID should include an early active focus on comprehension using a wide variety of texts and cooperative grouping practices.

The study conducted by Katims (2001) gives promising results. He conducted literacy assessment of children with mild to moderate intellectual disability in which a comprehension section was included. Results showed that students demonstrated relative strengths in the areas of naming the main idea of a narrative passage and reciting facts found within the

passage. They had difficulty with terminology, cause-effect relationships, inferential comprehension questions and making conclusions.

Reading comprehension should center on instruction which will allow the children to understand thoughts contained in sentences, comprehend meaning contained in paragraphs, and grasp the meaning and implications of entire selections. For some children these objectives are reasonable, for other children intellectual limitations will decrease the possibility of satisfactory achievement of these three aims.

Recent researches on reading comprehension of children with ID focus on various strategies of instruction. Systematic review of literature conducted by Alnahdi (2015) related to instructional strategies to improve reading skills for students with intellectual disabilities concluded that students with intellectual disabilities are in need to receive very intense practice and instruction to improve their reading skills and it should be provided explicitly, systematically, and consistently. To promote comprehension Bos & Vaughn (1994) suggested incorporate aspects of cognitive behavior modification. In a recent study conducted by Hua, Woods-Groves, Ford and Nobles (2014) regarding reading comprehension instruction using paraphrasing strategy on expository reading comprehension of young adults with intellectual disability resulted in improvement of the above skills. Specifically, they investigate the effectiveness of teaching a three step paraphrasing (RAP), that is, (1) Read a paragraph (R) (2) Ask myself what was the main idea and two details (A) (3) Put in to my own words (P). These authors recommended further studies which focus on generalization and maintenance of the strategy.

Wood, Browder and Flynn (2015) studied about the use of self-questioning strategy to comprehend social studies text for an inclusive setting and found that participants improved the number of questions generated and answered from baseline to intervention. Lundberg and Reichenberg (2013) in their research on developing reading comprehension among students with mild intellectual disabilities found out these students were capable of constructing meaning from written text by guided social interaction. Reciprocal Teaching (RT) and Inference Teaching (IT) were two intervention conditions used. In RT students practiced four active strategies – prediction, generating questions, clarifying and summarizing – whereas IT involved practice in answering inference questions. Improvement of test results was obtained for both conditions to about the same extent indicating that both interventions were beneficial.

Research studies in the areas of generalization and maintenance of reading comprehension skills in children with ID are rare. It may be because as mentioned by Kauffman and Hung (2009), generalizations are difficult with such diverse population as those with intellectual disabilities. But for these students generalization of learned skills is important. Anything taught (acquired) in the classroom or training situation need to be generalized so that the student should be able to apply the skill learnt to any appropriate situation. Similarly, the student should be able to maintain the skill overtime even after training procedures are withdrawn.

The present study aims at generalization and maintenance of reading comprehension in children with ID. For this the investigators designed a method called Literacy – Rich-Approach (LRA) and investigated its effectiveness in generalization and maintenance of reading comprehension. For designing this approach, the investigators adapted the three components of literacy rich environment mentioned in a study by Katims (1991). They are classroom library, daily story reading and writing centre. Katims used these components with a group of young students with disabilities including Intellectual disability. The investigators of present study added four more components to this. They are small group practice, ongoing monitoring, positive feedback and continuous reinforcement.

Specifically, this study aims to find out the effect of Literacy – Rich – Approach in the generalization and the maintenance (retention) of reading comprehension skills of (1) standard I higher level students with intellectual disability (2) standard I lower level students with intellectual disability and (3) standard III students with intellectual disability.

2. Methodology

A. Design

Pre-test-post test – control group design was selected for the present study.

B. Participants

Participants were 60 children (30 experimental and 30 control) belonging to the category of mild ID. Random sampling method was used in the selection of the study groups. The criteria for inclusion in the sample were: (1) Mild Intellectual Disability (IQ between 50 and 70), (2) Age between 7 -20 and (3) Ability to communicate verbally. Those who were having additional disabilities such as cerebral palsy, hearing impairment, visual impairment and autism were excluded. The sample includes three levels of students: Standard I higher, Standard I lower and Standard III. Out of 60, the higher functioning 20 students were given standard III test and they were in standard III level. Out of the remaining 40 children who have taken the pretest of standard I, students with top 20 scores were in standard I higher level and the rest were in standard I lower level. Thus there were 20 students in each level. In each level 10 students were randomly assigned in the experimental group and 10 students to control group. (Later one student in the experimental group of standard I lower level and one student in the control group of standard III discontinued due to illness). The procedure explained by Gay (1996) was adopted for random assignment. To determine whether there were any significant differences between the experimental and control groups on pretest, the independent" t" test was employed. Result indicated that the experimental and control groups in three levels do not differ significantly in pretest mean

scores. Another "*t''* test was also employed to check any difference in IQ of experimental and control groups and found no significant difference. It is shown in the following table.

Table 1
Mean, SD and t value of the IQ scores of the experimental and control groups at various levels

Level	Group	N	Mean IQ	SD	t value
Standard I Higher	Experimental	10	60.35	4.99	-0.32
	Control	10	61.10	5.55	
Not significant					
Standard I Lower	Experimental	10	58.70	6.15	-0.18
	Control	10	59.20	6.39	
Not significant					
Standard III	Experimental	10	62.20	4.85	-O.35
	Control	10	62.80	2.44	
Not significant					

C. *Setting*

The study was conducted in a special school of Kerala state, South India. The instruction using conventional approach followed in three class rooms. The instruction using LRA took place in a specially designed class room which is known as literacy-rich class room.

D. *Tools*

For collection of relevant data, investigators developed and standardized the following tools:

(1) Functional Reading Comprehension Assessment Test (FRCAT) for standard I.

This test was used for pretest, post test (to measure generalization) and retention test (to measure maintenance). The test includes (a) two word sentences with questions (b) long sentences with questions (c) short paragraph with questions and (d) long paragraph with questions. All questions in this section require the student to read the sentences/paragraph independently and answer to the questions that the examiner asks. There were a total of 14 items in the test. Scoring was given as follows: a score of 1 mark was given for two-word sentence and long sentence comprehension. For small paragraph and long paragraph, a mark of 2 was given for each sub question. Thus total mark for the test was 28. In each question partially correct answers were considered with ¼ mark deduction for each letter error and symbol error.

(2) Parallel Functional Reading Comprehension Assessment Test (PFRCAT)for Standard I.

The parallel test was prepared to measure acquisition level of reading comprehension. This test has the same characteristics as the FRCAT standard I that is, same number of items in each subtest, equal difficulty level and same score.

(3) Functional Reading Comprehension Assessment Test (FRCAT) for Standard III.

This test measures the student's ability to make meaningful sentences with given words, oral reading with comprehension, recall sequences of events or ideas, locate and/or recall answer to questions, follow simple cause and effect relationships, make questions and follow written directions. The test has following subsections: (a) make sentences using the words given in rows and columns, (b) read given paragraph, (c) read story and choose correct answer for the questions, (d) read paragraph and make question from it, and (e) read paragraph silently and find answer to questions.

Total mark for this test was 34. Scoring was done as follows: a score of 1 mark is given for all correct items except for making meaningful sentences and making questions. Two marks are given for these items. The subtest oral reading carries a score of 10 marks out of which 8 is given for correct reading and 2 for reading fluency.

(4) Parallel Functional Reading Comprehension Assessment Test (PFRCAT) for standard III.

This test measured the acquisition of reading comprehension skills of students of standard III. This test has the same characteristics as the FRCAT standard III that is, same number of items in each subtest, equal difficulty level and same score.

Split half reliability (0.99) and content validity of the tools were established through systematic procedures.

E. *Materials*

A reading comprehension package was prepared by the investigators including conventional and Literacy-Rich-Approach and it was followed in each level. This package includes 1) Lessons and materials used for conventional method of teaching-mainly word cards, sentence cards, copies of printed stories and worksheets. 2) For instruction using LRA, literacy rich classroom was furnished with materials such as word cards, sentence cards, picture charts, story books of various types, books for class room library, literacy activities for self-instruction and reinforcement, CD-ROMs to practice literacy skills and audio visual aids such as computer and tape recorder.

F. *Intervention*

This study was intended to find out the effectiveness of Literacy-Rich-Approach in the generalization and maintenance of reading comprehension skills in children with intellectual disability when compared to the conventional approach. Alberto and Troatman (1995) explained the terms acquisition, generalization and maintenance clearly. Acquisition is the presence of the ability to do something the student wasn't previously able to do and do it with some degree of accuracy. Generalization is the expansion of student's capability of performance beyond for those conditions set for initial acquisition. Maintenance is the ability to perform the response overtime without re teaching. To measure generalization and maintenance of Reading comprehension skills it was necessary to measure level of acquisition first. It is the initial stage of learning.

Instruction through conventional approach was done using parallel content and experimental and control groups were taught every day for one hour using this approach. Parallel content for standard I was taught to standard I (higher as well as lower levels) students and parallel content of standard III was

taught to standard III students. To increase the external validity of the study three qualified and experienced teachers were selected for each level for teaching using the conventional approach. Teachers taught following the lesson plans prepared by the investigators. They were never given any information regarding the outcome of the study. At the end of instruction parallel test was administered and first measured the acquisition level. Instruction using LRA was done by the principal investigator and every day the three treatment groups were taught for one-hour duration.

G. Literacy – Rich-Approach (LRA)

It is an approach used for teaching reading and writing. In this approach, students were taught in small groups. Classroom library with age and level appropriate books were provided. Stories were read daily by teachers and students themselves. Story books, story charts and CD ROMs were used for this purpose. In the classroom there was a writing center where students can practice writing. Student's progress was monitored continuously and positive feedback and continuous reinforcement were given by the teacher.

Total intervention time was 20 hours that is 2 hours per day for 10 days.

H. Data Collection

The data was collected in four stages. We administered the pretest before intervention. Right after intervention the parallel test was given. This measured the acquisition level of reading comprehension development. After completing parallel test the post test was given and this measured generalization level of reading comprehension development. Lastly the retention test was given after 6 months of intervention to measure maintenance level (It is the same test given for pretest and post test).

I. Statistical techniques used

The following statistical techniques were used: Mean, standard deviation, student's *'t'* test, and Analysis of Covariance (ANCOVA). Gay (1996) and Shavelson (1988) reported the ANCOVA is a superior method that can be used for a study based on a pretest – post test - control group design, as it controls the effect of pretest differences among groups.

3. Results

The effectiveness of the programme was judged by analyzing the difference between

(1) Pretest and generalization test mean scores and (2) pretest and maintenance test mean scores.

A. Effect of Literacy-Rich-Approach in the Generalization of Reading comprehension skill of standard I higher level students

The result (Table 2) shows that there is significant difference between experimental and control group in generalization test ($F_{1.17}$ = 6.91 p< 0.05). This shows that LRA was effective in generalizing of reading comprehension skills.

Table 2
F-ratio of Reading comprehension Scores in Pre, and generalization Tests of Standard I Higher level Students with Intellectual Disability
(Maximum possible score is 28)

Test	Group	*N*	Mean	*SD*	*F*-Value (ANCOVA)
Pretest	Experimental	10	6.00	6.33	
	Control	10	7.35	8.10	
Generalization test	Experimental	10	22.68	7.46	6.91*
	Control	10	14.95	9.73	

*Significant at 0.05 level.

B. Effect of Literacy-Rich-Approach in the maintenance of reading comprehension skills of standard I Higher level students

Table 3
F-ratio of Reading Comprehension Scores in pre and Maintenance Tests of Standard I Higher Level Students with Intellectual Disability
(Maximum possible score is 28)

Test	Group	*N*	Mean	*SD*	*F*-Value (ANCOVA)
Pretest	Experimental	10	6.00	6.33	
	Control	10	7.35	8.10	
Maintenance test	Experimental	10	24.48	5.01	17.47*
	Control	10	12.43	10.26	

**Significant at 0.01 level.

The result (Table 3) shows that there is significant difference between experimental and control group in maintenance test ($F_{1.17}$ = 17.47 p< 0.01). This shows that LRA was highly effective in maintaining the reading comprehension skills.

C. Effect of Literacy-Rich-Approach in the Generalization of Reading Comprehension skills of standard I Lower Level Students.

Table 4
F-ratio of Reading comprehension Scores in pre and Generalization Tests of Standard I Lower Level Students with Intellectual Disability
(Maximum possible score is 28)

Test	Group	N	Mean	SD	F-Value (ANCOVA)
Pretest	Experimental	10	0.00	0.00	
	Control	10	0.00	0.00	
Generalization test	Experimental	9	2.50	3.26	3.33
	Control	10	0.60	0.52	

The result (Table 4) shows that even though there is difference in the mean scores of experimental and control groups, there is no significant difference between two groups in generalization test ($F_{1.17}$ = 3.33 p> 0.05)

D. Effect of Literacy-Rich-Approach in the Maintenance of Reading Comprehension skills of standard I Lower Level Students

Table 5
F-ratio of Reading comprehension Scores in pre and Maintenance Tests of Standard I Lower Level Students with Intellectual Disability.
(Maximum possible score is 28)

Test	Group	*N*	Mean	*SD*	*F*-Value (ANCOVA)
Pretest	Experimental	10	0.00	0.00	
	Control	10	0.00	0.00	
Generalization test	Experimental	9	3.89	4.65	5.93*
	Control	10	0.30	0.48	

*Significant at 0.05 level.

As shown in (Table 5) there is significant difference between experimental and control group in maintenance test ($F_{1.16} = 5.93$ $p < 0.05$). This indicates LRA was effective in maintaining the reading comprehension skills.

E. Effect of Literacy-Rich-Approach in the Generalization of Reading Comprehension skills of standard III Students with Intellectual Disability

Table 6
F-ratio of Reading Comprehension Scores in pre and Generalization Tests of Standard III Students with Intellectual Disability
(Maximum possible score is 46)

Test	Group	*N*	Mean	*SD*	*F*-Value (ANCOVA)
Pretest	Experimental	10	17.68	14.23	
	Control	10	16.20	8.06	
Generalization test	Experimental	10	38.18	10.32	1.47
	Control	9	33.22	4.98	

The result (Table 6) shows that there is no difference between experimental and control groups in generalization test ($F_{1.16} = 1.47$ $p > 0.05$).

F. Effect of Literacy-Rich-Approach in the Maintenance of Reading Comprehension skills of standard III Students with Intellectual Disability

Table 7
F-ratio of Reading comprehension Scores in pre and Maintenance Tests of Standard III Students with Intellectual Disability
(Maximum possible score is 46)

Test	Group	*N*	Mean	*SD*	*F*-Value (ANCOVA)
Pretest	Experimental	10	17.68	14.23	
	Control	10	16.20	8.06	
Generalization test	Experimental	10	36.38	10.30	11.40**
	Control	9	22.19	9.82	

**Significant at 0.01 level.

The result (Table 7) shows that there is highly significant difference between experimental and control groups in maintenance test ($F_{1.16} = 11.40$ $p < 0.01$). This indicates that LRA was highly effective in the maintenance of reading comprehension skills.

4. Discussion

The purpose of the study was to examine the effect of Literacy-Rich Approach (LRA) in the generalization and maintenance of reading comprehension skills of children with intellectual disability. The pretest result showed that before intervention the experimental and control groups performed similarly in reading comprehension. After intervention the result showed that LRA was effective for all three treatment groups. It was highly effective for standard 1 higher level students. They generalized and maintained reading comprehension skills much better than control groups. In the case of standard I lower level students the effectiveness of LRA was seen in maintenance. For standard III although the mean score was higher for experimental group, significant difference between groups was seen in the maintenance of stage only.

The result of the study is in agreement with the first empirical study of katims (1991) in which the literacy rich environment improved the literacy skills of students with disability including ID. When going in to the depth of the study several factors are disclosed. Systematic use of conventional method is one. In all levels (standard I higher, standard I lower, and standard III students' performance improved a lot just by conventional approach and it can be seen in the result of parallel tests.

5. Practical Implications

Since reading comprehension is one of the hardest area for instruction for children with ID, the results of the study gives some practical implications in developing, generalizing and maintaining reading comprehension skills. In the field of special education underestimation of the potentials of children with intellectual disability especially to mild category exists. Conventional approach is being used in schools for literacy instruction. As it is seen from this research this approach may be adequate for initial acquisition if used systematically. But whatever may be the materials they learned students with ID will forget them soon since no effective measures are taken for generalization and maintenance. The usual conclusion made by special teachers, parents and even professionals is that children with intellectual disability are incapable of comprehending text and they don't have long term memory or no hope for academic skills, etc. The results of maintenance test which was administered six months after intervention, give empirical evidence that these students can and will maintain reading comprehension skills if the teaching method is effective. After all the aim of education is to maintain what is learned.

It can be stated that in this study the application of each component of LRA contributed to the improvement of reading comprehension for students in the experimental groups. Dividing students in to small groups benefited students as well as teacher. For example, children sought help each other, reduce teacher's work load etc. Daily story reading was really an entertainment for students. Without knowing the benefit of it, students in the experimental group automatically improved their reading as well as listening comprehension skills. Similarly, classroom library was a privilege for them. Even though sometimes they did not read the allotted portion completely, using library books improved their status as a student. Reading practice using CD-ROMS and computers was a motivation as reinforcement. As Scruggs (2008) observed technology offers a whole world of possibilities for students with disabilities. In writing center students could see their work as a written document. The ongoing monitoring, positive feedback and continuous reinforcement were the components that kept the student-teacher relationship, improve student's self-esteem, maintain the quality of their work and shaped their total behavior in and out of classroom. All the components of LRA aided the maintenance of skills even after six months.

6. Conclusion

It can be concluded that if special educators take time to develop innovative measures of instructional activities and apply them in day to day teaching, literacy skills of children with ID will definitely be improved. Improvement in reading comprehension skill will enable them to live independently to certain extent. They can read current matters (Newspaper, magazines etc.) and procure information and thus improve general knowledge. Also they can use free time meaningfully by engaging in reading for entertainment (stories, dramas. comics, cartoons etc.). Person who are proficient in literacy skills are considered as intellectually superior to those who cannot and they will be treated well.

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