

https://dspace.org/

Effectiveness of mnemonic instruction in enhancing of reading ability among grade three learners with dyslexia in two primary schools in South Africa

Lilian Zindoga; Peter Aloka

https://hdl.handle.net/10539/40180
DOAJ

Downloaded from a DSpace repository. https://dspace.org/

Effectiveness of Mnemonic Instruction in Enhancing of Reading Ability Among Grade Three Learners with Dyslexia in Two Primary Schools in South Africa

Lilian Zindoga, PhD Candidate
Wits School of Education,
University of the Witwatersrand, South Africa

Peter JO Aloka, PhD
Wits School of Education,
University of the Witwatersrand, South Africa

Abstract

The current study assessed the efficacy of the mnemonic instruction (MI) in enhancing reading abilities among grade three learners with reading disability in two government schools (grade R to 7) in Mpumalanga, South Africa. Skinner's reinforcement and the Information Processing theories were employed. A research method used to estimate causal relationships without random assignment was used. One of the two schools was an intervention and the other one was a control one. 43 participants were included in the study from the two selected schools using purposive sampling technique. 23 parents (from the intervention school) participated in the questionnaires. The Bangor Dyslexia Test (BDT), pre- and post- tests, and a reading comprehension test were the tools used to collect data. The results revealed that there were statically substantial differences between the assessment scores administered before and after treatment for the experimental group, t (22) = -10.753; p <.001, suggesting that mnemonic instruction is highly effective in enhancing reading abilities among primary school LWD. This investigation advocates that the Department of Basic Education should revise the policy that reading is tested from grade one, instead of from grade three, that those who are not able to read do not proceed until and unless they are able to read, and to train teachers on how to use various approaches to enhance reading abilities, including mnemonic techniques.

Keywords: mnemonic instruction (MI); reading ability; learners; dyslexia; primary schools.

Introduction

For a long period of time, mnemonic strategy has been proved to be the blueprint for teaching students with learning disabilities (LD) or Mild Intellectual Disability (M.I.D). In terms of mnemonics, Pattern, (1990) asserts that objective testing confirmed that use of perception skills increased recall several number of times. Remembering is

one of the key components of human perception, and it is critical for learning new information and allows one to plan for the future. MI has proved to be highly effective. Constant recitation of rhymes and songs that are linked to content learnt, is vital for learners, let alone those with dyslexia, to grasp content for longer periods. On one hand, Shaw, Hennessy, and Anderson (2022) define dyslexia as a Specific Learning Disability that impact on literacy. Contrastingly, mnemonics is a Greek word that is derived from 'mnemonikos' and is a technique used to assist memory. Jurowski, et al., (2015) postulate that memory techniques are effective ways of organizing how to remember content, which can often improve performance and retrieving of information or events. Mnemonic Instruction (MI) includes various plans of action that are applicable across different situations and maybe used effectively with students with varying abilities. A significant amount of research on memory and recall and how it affects the way one remembers words learnt shows that memory techniques can improve the process of acquiring building blocks in second language, improve remembering content, and originality (Scruggs, et al., 2010). Memory strategies, especially acronyms, therefore, can be used by teachers in high school or even in tertiary education.

Some researchers in Africa have reported on the effectiveness of mnemonic instruction on learners with varying abilities and disabilities, including learning disabilities and intellectual disabilities. In South Africa, a qualitative study by Dwarika (2019), indicated that individuals who were involved in the study had developed a clear understanding of about ecosystem challenges that affect the way they acted and were able to examine themselves about their changed practices resulting from their participation in the inclusive education positive behavior support model. Again, in the same country, a study by Dean, et al., (2021) announced that most published studies demonstrated positive outcomes of Information and Communication Technology (ICT) reading interventions on learners' reading. This, therefore, implies that MI is an effective method that may be used across various disciplines as well as across different capabilities. It can also be used by mainstream teachers as well as in resource rooms and in special schools. A lot of reviewed literature looked at challenges faced by teachers and learners in terms of teaching reading in primary schools but in this present study, the researcher went ahead to experiment to investigate how to improve the way grade three LWD read in junior schools in Mpumalanga, South Africa.

Theoretical Framework

The Skinner's Operant Conditioning Theory and the Information Processing Theory are the theories which acted as a lens to the research. The Operant conditioning theory was advanced by BF Skinner and the key element in it is reinforcement (Rafi, et al., 2020). Overskeid (2018) also posits that a stimulus that strengthens or weakens the behavior that is produced is referred to as a reinforcer. In this study, to make a follow-up on Skinner's reinforcement theory, grade three LWD who were able to read a stipulated

number of words, were allowed to choose any short- story books of their choice from the library and take them home to read for a week.

When Skinner applied a method of learning that uses rewards and punishment to modify behaviour, (Schunk 2012), the learners were expected to answer every question and receive instant response. In this case, positive behaviour would reoccur since intermittent reinforcement is particularly effective. The process of encouraging learners enables them to respond again each time they respond correctly and get a positive response (Schunk 2012). According to Schunk (2012), positive reinforcement refers to the process of encouraging a pattern of behaviour by offering reward when the behaviour is exhibited so that the behaviour continues to be displayed. Reinforcers depend on situations because they may apply to certain individuals under different conditions but may be the opposite to other people (Skinner, 1957; Critchfield & Miller, 2017). Skinner (1953) further highlighted that things that trigger a physical or behavioural change can be anticipated in some cases.

The Information Processing Theory (IPT) was also used to inform this study. The theory describes how our brains code information and select small amounts of memory from a short time ago against the capacity to recall memories from a long time ago. The first concept refers to any meaningful unit including digits, words or people's faces, and the active memory that retains information for a short time. Miller, (1956) highlighted that working memory or temporary storage can store information for a short time. The second IPT concept uses the computer as a representation of a person (Miller, 1956). There are three kinds of memory namely one that receives information that a person perceives, one that retains information for a short while and one that retrieves and recalls memory for long periods and is infinite.

Literature Review

Written works on devices that aid recall, and which emphasize their successfulness do exist. A lot of research on memory training and its effect on the stock of words used in a language reflects that mnemonic devices can improve the learning of new words, improve memory, and increase inventiveness (Scruggs, et al., 2010). A study by Fatima (2020) outlined that use of rhymes and songs intended to help learners remember what they have learnt can improve their proficiency in acquiring new words in second language. In this study, grade three LWD mastered reading three-letter words, to begin with, then bigger and complex words and sentences through using music mnemonics, rhymes to be specific. In Saudi Arabia, Al-Khawaldeh and Al-Khasawneh (2019), established that using similar sounding words when teaching new words to LWD was effective. The study claimed that many researchers have confirmed the successfulness of teaching learners with learning problems using the method that connects learning of new words and prior knowledge. In addition, Lubin and Polloway (2016) in the United States

of America found that instructional strategies created to improve remembering of information are successful when teaching learners of different abilities in different subjects. The study outlined that MI helped many learners who had different problems in academic performance.

In Romania, Cioca and Nerisanu (2020) concluded that there were effects of associating an image with characters whose name sounds like the item that must be memorized in relation to the ability to generate original ideas that solve problems, but it was done among high school learners. Therefore, the current research pursued this study's recommendations by focusing on grade three LWD. Similarly, Whitescarver (2018) in USA confirmed mnemonic tools as best for improving learning and focusing on what one is learning to minimize distractions. Whitescarver (2018) further highlighted using MI to assist learners with learning problems to acquire new knowledge. In Nigeria, Akinsola (2014) study concluded that mnemonic and instructional strategies to activate prior knowledge were more effective at improving the students' achievement in Mathematics. In Kenya, Makau, et al., (2019) study found out that use of MI yielded positive results in social studies but did not reflect any changes in the skills and knowledge of learners in Mathematics.

The Present Study

The current research examined the successfulness of MI on improving capabilities to read among LWD in primary schools.

Research Hypothesis

The following null hypothesis was tested:

There is no significant success of mnemonic instruction on enhancing reading ability among LWD in elementary schools.

Methods

Research Design

This study adopted the field experiment which includes trials where the investigator controls allocation, which is not at random (Handley, et al., 2018). Iwahori, et al., (2022) suggests that field methods have several designs to choose from that one can adapt depending on their context, can be used when there are practical or ethical reasons why participants cannot be randomised. de Vocht, et al., (2021) concurs that quasi-experimental research designs are less susceptible to bias than other observational study designs. In this current research, a field experiment with one control group and one intervention group was used.

Research participants

In this study, the quantitative sample was 43 grade three learners from the two public primary schools (23 LWD in the experimental group and 20 LWD in the group which does not receive the test variable), one from Ximhungwe and another from Mkhuhlu Circuits (respectively) in Bohlabela district, Mpumalanga province. The learners were obtained using purposive sampling method. A group of non-probability sampling techniques in which units are selected because they have characteristics that you need in a sample is 'used to select respondents that are most likely to yield appropriate and useful information' and it allows researchers to save time and money while they are collecting data (Campbell, et al., 2020). The purposive sampling technique was relevant for the study because it clearly situated both the quantitative and qualitative results in terms of trustworthiness for data collection and analysis.

Research Instruments

In the present study, pre-testing was administered using the BDT and a small passage to test understanding. The extent to which the observed results represent the truth in the population we are studying and are not due to methodological errors of questionnaires was ascertained and from the Bartlett's test for Sphericity, the validity results indicated that al scales are valid since ($p<0.001$, $p=0.000$) and Kaiser-Meyer-Olkin indexes are all > 0.6 (Tabachnick & Fidell, 2001). The measure of internal consistency or how closely related a set of items are as a group value of 0.833 for the questionnaires was reported. This measure of scale reliability for all the subscales reveal that the instruments had all parts of the test contributing equally to what was being measured in the present study. This is in agreement with the recommendation by Oso and Onen (2009) that a coefficient of at least 0.60 is of adequate reliability, implying that the product is able to perform as expected over time.

Procedure

Approval of an instrument to measure the ethical fulfilment of the research process was first obtained from the University of the Witwatersrand Human Research Ethics Committee. Thereafter, the Mpumalanga Department of Education and the school principals gave the researcher the go ahead to carry out the research. A total of 43 learners (23 learners for the intervention school and 20 learners for the control school) were randomly selected but taking into consideration how many wrong answers one got. It had 19 items, and the rule was that a grade three learner who attained seven or more wrong answers was considered to be dyslexic. In the end, 43 learners were selected. After the pre-test, LWD from the intervention school received intervention lessons on mnemonic reinforcement techniques for one hour per day, five times a week for 6 months while those from the control school continued receiving their usual reading lessons without any intervention. Tests to measure the learners' achievement

after completion of an intervention program was given to the LWD at the two research sites after 6 months.

Data Analysis

Data that can be counted or measured in numerical values was scrutinized by testing hypothesis and deriving estimates. The inferential statistics aided to work out conclusions. Statistical tests and t-test analysis were employed to investigate the differences between the variables, given gender and age. All tests of significance were calculated at $\alpha = 0.05$. A software package used for the analysis of statistical data; version 26.0 was used to examine the facts.

Results

The current academic work investigated the effectiveness of mnemonic reinforcement techniques on reading abilities among grade three LWD. The null hypothesis being tested was "*Mnemonic instruction has no significant effect on enhancing reading ability among grade three learners*". The hypothesis was tested using experimental data, where two groups of LWD were considered, intervention and control group. Group-1, the intervention group, received intervention on the capacity to read, comprehend, interpret and decode written language and texts using mnemonic reinforcement technique. Contrariwise, Group-2, the group in the experiment which a variable is not being tested, were only taught reading through the normal conventional way. A pre-test reading assessment test was conducted to both groups. After the pre-test, learners from the experimental group were issued mnemonic reinforcement, while those from the control group continued receiving their usual reading lessons without any intervention. Once the time when learners received supplementary instruction without interrupting the core curriculum expired, an assessment measure received after treatment was administered to both the groups of LWD. Independent tests and those that compare the means of two measurements taken from the same individual were engaged to establish the variation in the ability to read when comparing the mean of one group to the one of another group of the LWD. The learners' reading skills were measured using two sub-scales: reading test and comprehension test. Table 1 shows the groups and descriptive statistics of their performance in reading and comprehension tests.

Type of Test	Group		n	Mean	Std. Deviation	Std. Error
Reading Test	Pretest scores	Group 1	23	0.82	1.46	0.305
		Group 2	20	2.05	2.72	0.609
		Total	43	1.44	2.21	0.336
	Post-test scores	Group 1	23	19.78	10.38	2.164
		Group 2	20	3.15	3.95	0.883
		Total	43	12.05	11.57	1.764
Comprehension Test	Pretest scores	Group 1	23	0.87	1.22	0.060
		Group 2	20	0.90	1.11	0.250
		Total	43	0.89	1.16	0.177
	Post-test scores	Group 1	23	3.52	1.75	0.366
		Group 2	20	0.50	1.00	0.224
		Total	43	2.01	2.09	0.319

Table 1. Descriptive statistics of the scores of the two groups –mnemonic techniques
Source: English Language Reading Test Scores (2022)

Table 1 displays the descriptive statistics of pre-test and post-test scores in reading and comprehension tests which were obtained before and after mnemonic techniques. It is important to note that LWD who were given mnemonic treatment exhibited comparatively higher abilities in all aspects of reading skills than their counterparts who did not receive the same treatment. It is also evident that post-test scores from group 1 in both reading and comprehension tests were higher. For instance, the average score recorded for the post-test reading by Group-1 learners was 19.78 (*SD*=10.38) and post-test mean score of Group-1 learners in comprehension test was 3.52 (*SD*=1.75). Conversely, the least score recorded were from pretest reading (Mean=0.82; SD=1.46) for Group-1 learners and comprehension (Mean=0.50; SD=1.12) test results for Group-2 learners. Also notable, all the learners generally performed poorly in comprehension than in reading, while pre-test scores were all lower than post-test scores in all the two aspects of reading skills. However, to investigate whether there is any statistically significant difference in reading abilities between those were given mnemonic training and those who only received the traditional teaching, four different pairs were compared using t-tests and findings were shown in Table 2:

Pair	Groups	Mean	Mean Difference	Std. Error Mean	T	df	Sig.
Pair 1	Group-1 pre-test - Group-2 pre-test	1.04 2.30	-1.256	.844	-.1487	41	.145
Pair 2	Group-1 pre-test - Group-1 post-test	1.69 23.30	-21.610	2.009	-10.753	22	.000**
Pair 3	Group-2 pre-test - Group-2 post-test	2.95 3.65	-.700	.696	-1.005	19	.327
Pair 4	Group-1 post-test - Group -2 post-test	23.30 3.65	19.65	2.612	7.523	41	.000**

Table 2. Pairwise comparison of pre-test and post-test scores for control and intervention (mnemonic treatment) groups in reading test
**significant @ 5% level ** significant @ 1% level*

From Table 2, the results of an independent t-test analysis reveal that there was no statistically significant difference in pretests scores between the control and experimental group reading skills [t (41) = -1.487; p =.145] as indicated in Pair 1 results. This finding suggests that the two groups did not have remarkable differences in scores before the intervention hence signifying that the randomization process was effective. This ratifies that the experimental noise and confounding variables were excluded, suggestive of adequate internal validity of the data. To investigate whether there was statistical difference between pretest scores and posttest scores for the learners who were treated on mnemonic technique, a paired sample t-test was used as shown in pair 2. The results revealed that there is a statically significant difference between pre-test and post-test scores for experimental group, t (22) = -10.753; p <.001, suggesting that mnemonic instruction is effective in enhancing reading abilities among the primary school LWD. Further, an investigation was done to find out whether the existing difference in reading abilities was exclusively due to use of mnemonic instruction technique or effect of any other intervening variable which was not included in the study. A paired sample t-test on pair 3 (Control Group Pretest - Group-2 and Control Group Post-test -Group 2) indicate that there was no statistically significant difference, t (19) = -1.005, p =.327 (ns). This shows that there is no difference between pre-test scores and post-test scores in reading skills among the learners who did not receive any treatment.

Additionally, an investigation to establish whether the significant difference found between the pretest and posttest scores for the experimental group was solely attributed to the treatment factor or other factors was conducted. This was done by conducting a test on pair 4 that checked whether there was any significant difference between posttest scores of the experimental and control group learners. The result

shows that there was a statically significant difference between experimental group post-test (Group-1) and control group post-test (Group-2), t (*41*) = 7. 523, p <.001. The mean scores in posttest exams for the intervention group (n=23; *Mean*=23.30; *SD*=21.18) was significantly higher than the mean score in posttest for the control group (n=20, *Mean*=3.40; *SD*=7.65). This rise in mean score omits the influence of pre-test procedure on the score, therefore it was concluded that the statistical significant difference in reading skills between the LWD who were taken through mnemonic training technique and those who received the traditional training was largely attributed to treatment effect, which means that mnemonic teaching strategy has a significant effect on enhancement of reading ability among primary school grade three LWD.

Hypothesis Testing

$H_0$1: *Mnemonic instruction is effective in enhancing reading ability among grade three learners with dyslexia.*

The objective of the study was to investigate the effectiveness of mnemonic reinforcement techniques on reading abilities among grade three LWD. Null hypothesis, "***Mnemonic instruction has no significant effective on enhancing of reading ability among grade three learners with dyslexia***", was tested. The hypothesis was tested using experimental data, where two groups of LWD were considered, intervention and control group. Group-1, the intervention group, were given treatment by training them on reading skills using mnemonic reinforcement techniques. On the other hand, Group-2, the control group were not treated, but only received the traditional teaching of reading. A pre-test of reading assessment test was administered to both the intervention and control groups. After the pre-test, learners from the intervention group received intervention using the first intervention using mnemonic reinforcement technique, while those from the control group continued receiving their usual reading lessons without any intervention. After the intervention period expired, a post-test 1 was administered to both groups. Given that the study used the standard pretest-posttest two-group design for both intervention and control groups, both independent and paired sample t-test were used to determine the difference in reading ability between the two groups. The different combinations of pretested and post-tested for treatment and control groups allowed the researcher to ensure that confounding variables and extraneous factors did not influence the results. Reading skills were measured using two sub-scales reading test and comprehension test. Table 3 shows the groups and descriptive statistics of their performance in reading and comprehension tests.

Type of Test	Group		N	Mean	Std. Deviation	Std. Error
Reading Test	Pretest scores	Group 1	23	0.82	1.46	0.305
		Group 2	20	2.05	2.72	0.609
		Total	43	1.44	2.21	0.336
	Post-test scores	Group 1	23	19.78	10.38	2.164
		Group 2	20	3.15	3.95	0.883
		Total	43	12.05	11.57	1.764
Comprehension Test	Pretest scores	Group 1	23	0.87	1.22	0.060
		Group 2	20	0.90	1.11	0.250
		Total	43	0.89	1.16	0.177
	Post-test scores	Group 1	23	3.52	1.75	0.366
		Group 2	20	0.50	1.00	0.224
		Total	43	2.01	2.09	0.319

Table 3. Descriptive statistics of the scores of the two groups –mnemonic techniques
Source: English Language Reading Test Scores (2022)

Table 3 shows the descriptive statistics of pretest and posttest scores in reading and comprehension tests which were obtained after mnemonic techniques. It is evident that the highest scores in both reading, and comprehension tests was the post-test scores, all from group 1 (intervention group). The means score recorded for the post-test reading by Group-1 learners was 19.78 (SD=10.38). It was followed by the post-test mean score of Group-1 learners at 3.52 (SD=1.75) in comprehension test. However, the least score recorded were from pretest comprehension (Mean=0.09; SD=0.29) and reading (Mean=0.43; SD=1.46) test results for Group-1 learners. It is clear that the learners generally performed poorly in comprehension than in writing and the pre-test scores were all lower than post-test scores in all the two aspects of reading skills.

The results indicate that intervention group showed relatively higher abilities in all aspects of reading skills than their counterparts who did not receive treatment. However, to investigate whether there is any statistically significant difference of reading abilities between experimental and non-experimental groups, four different pairs were compared using t-tests and findings were shown in Table 4.

Pair	Groups	Mean	Mean Difference	Std. Error Mean	T	df	Sig.
Pair 1	Group-1 pretest - Group-2 pretest	1.04 2.30	-1.256	.844	-.1487	41	.145
Pair 2	Group-1 pretest - Group-1 post-test	1.69 23.30	-21.610	2.009	-10.753	22	.000**
Pair 3	Group-2 pretest - Group-2 post-test	2.95 3.65	-.700	.696	-1.005	19	.327
Pair 4	Group-1 post-test - Group -2 post-test	23.30 3.65	19.65	2.612	7.523	41	.000**

Table 4. Pairwise comparison of pre- test and post-test scores for control and intervention (mnemonic treatment) groups in reading test
**significant @ 5% level ** significant @ 1% level*

From Table 4, pair 1 is a comparison between experimental group and control group pre-test scores on reading skills. The pretest scores in the two groups were compared to establish whether the randomization process was effective. The pretesting of the two groups gave the researcher an opportunity to confirm if the experimental noise and confounding variables was filtered out. Hence, it ensured that internal validity was met because the pretest results gave the understanding of equivalency of the two groups. The variances of the two groups were assumed equal and the sample of LWD who were selected for the study was assumed to have been drawn from normally distributed data. Hence, it was established that there was no statistically significant difference in pretests scores between the control and experimental group reading skills, t (41) =.225; p =.145. This finding indicates that the two groups did not have notable differences in scores before the intervention thus indicating that the randomization process was effective. It confirms that the experimental noise and confounding variables were excluded, suggesting adequate internal validity. Further, a paired sample t-test was used to investigate the existence of differences between pretest scores and post score for experimental group, as shown in pair 2. The results established that there is a statically significant difference between pre-test and post-test scores for experimental group, t (22) = -10.753; p <.001. Given that the difference is statistically significant at 1% level, it was concluded that mnemonic instruction is effective in enhancing reading abilities among the primary school LWD.

However, it is not known whether the existing difference in reading abilities is exclusively due to use of mnemonic instruction strategies or any other superseding variable which is not included in the study. Therefore, the study further explored solution with two control group design, as refinement over the finding. This was conducted using a paired sample t-test on pair 3 (Control Group Pretest - Group-2 and Control Group

Post-test -Group 2). The results revealed that although there was a positive paired samples correlation, there was no statistically significant difference between pre-test scores and post-test scores in reading skills within the control group [*t* (19) = -1.005, *p* =.327 (ns)]. However, looking at the descriptive statistics of the control group, there is evidence that reading skills score at pretest improved from a mean of 2.95 (*SD*=3.10) to a mean of 3.65 (*SD*=4.43) at posttest score translating to a rise of 0.7. However, even though there was improvement in performance in reading skills, the improvement was not statically significant. Nonetheless, at least some improvement in performance in reading skills was expected because the learners were being taught whilst using the traditional method of teaching reading skills.

Further investigation to establish whether the significant difference found between the pretest and posttest scores for the experimental group was solely attributed to the treatment factor or other factors. This was done by conducting a test on pair 4 that checked whether there was any significant difference between posttest scores of the experimental and control group learners. An independent sample t-test analysis result shows that there was a statically significant difference between experimental group post-test (Group-1) and control group post-test (Group-2), *t* (*41*) = 7.011, *p* <.001. The mean scores in posttest exams for the intervention group (*n*=23; *Mean*=38.47; *SD*=21.18) were significantly higher than the posttest mean score for the control group (*n*=20, *Mean*=3.40; *SD*=7.65). This rise in mean score excludes the influence of pre-test procedure on the score, hence it can be concluded that the statistically significant difference in mean scores noted was mainly attributed to treatment effect, which means that mnemonic teaching strategy has a significant impact on primary school grade three LWD reading skills.

Hypothesis Testing- Effect of Mnemonic Instruction on Enhancing Reading Ability

The null hypothesis of the study was, "***Mnemonic instruction has no significant effect on enhancing reading ability among grade three learners***". The paired sample t-test used to investigate the existence of differences between pretest scores and post score for experimental group revealed that there was a statically significant difference [*t* (22) = -10.753; *p* <.001] in leaners reading ability before intervention and after intervention. On the contrary, the study established that there was no statistically significant difference in leaners reading ability scores between pretest scores and post score for the control group [*t* (19) = -1.005; *p* =.327]. Further, given that the study had shown that randomization process was effective during sampling of the experiment and control groups, it was evident that reading ability among the grade three LWD was enhanced by mnemonic intervention. Hence, the null hypothesis was rejected, and it was concluded that mnemonic instruction is effective in enhancing reading abilities among the primary school LWD.

Discussion

The study findings revealed that many LWD who had been put on mnemonic intervention for two terms generally found use of mnemonics helpful as it enabled individuals to learn, retain and recall words and information easily for prolonged periods. This finding is in line with recent research (Khawaldeh & Khasawaneh, (2019); Othman, (2019); Metsala & David, (2017); Whitescarver, (2018), Marthila, (2019); Fatima (2020) study which reported that the application of the mnemonic techniques can improve students' vocabulary learning, retention, and mastery and that language learners will remember better and for a longer time. In addition, mnemonics help improve an individual's long-term memory. This finding agrees with Miller's (1956) assertation on the Information Processing Theory (IPT) which reports that the Long-Term Memory (LTM) stores all previous perceptions, knowledge and information learned by the individual. The Information Processing Theory also claims that visual imagery is easier to recall than abstractions and this enabled grade three LWD to read given vocabulary words at the end of the term when they were tested on their reading.

The research findings revealed that behavior change was reported as one of the major positive effects of the mnemonic reinforcement technique among LWD where some negative behavior among LWD such as absenteeism, coming late to school, shyness, and theft, changed to regular attendance, being punctual, development of self- esteem and being innocent, respectively. This finding agrees with Skinner's (1953) theoretical assertion that to shape behavior, one adheres to identifying what the student can do presently, identify the desired behavior, identify potential reinforcers in the student's environment, break the desired behavior into small sub-steps to be mastered sequentially and move the student from the initial behavior to the desired behavior. The results indicated that the Grade three LWD developed recognition of letter sounds, three-letter- words, longer words as well as sentences and recall performance improved after the intervention because of exposure to the mnemonic technique intervention in the experimental school.

While Lubin and Polloway (2016); Siegel (2017) and Mahdi and Gubeily (2018) agree that mnemonic is effective with learning problems, Amadi and Offorma (2019) indicated that synthetic phonics significantly improved pupils' achievement in reading more than analytic phonics. In the same vein, a grade three LWD would learn to read words and sentences through music mnemonics whereby they start by learning a rhyme or song then use the rhyme or song to 'recite' words or sentences to be learnt. This finding is consistent with Fasih, et al., (2017) study which reported that mnemonic vocabulary instruction increased student engagement and motivation towards new vocabularies. In agreement, studies by Marthila (2019) and by Othman, et al., (2019) both revealed that there was significant effectiveness of using mnemonic technique in teaching vocabulary mastery and that students had positive attitudes towards the mnemonic

keyword method that was used to instruct vocabulary. The implication of this is that teachers must use mnemonic instruction that improves recalling of sight, vocabulary words and definitions as well as improve spelling and dictation. Hence, principals should organize demonstration lessons at school level that are led by knowledgeable colleagues or external resource persons who are well- versed with mnemonic techniques. In addition, foundation phase teachers should adopt memorization strategies like mnemonic instruction that make LWD remember content learnt.

Conclusion & Recommendations

The research study concluded that memorization techniques help individuals to learn, retain and recall information easily, for a long time. It also concluded that mnemonics help improve an individual's long-term memory since Long -term memory stores all previous perceptions, knowledge and information learned by the individual and enables LWD to read any given vocabulary words. Using picture-word/ sentence matching, audio-visual aids, constant recitation of rhymes, behavior change, and improvement in spelling and dictation helped LWD to be able to read. The study also concluded that several learners who participated in the intervention programme improved, not only in English, but also in other subjects like XiTsonga and Mathematics. The research study recommends that the Department of Basic Education should organize workshops that train teachers in various approaches like mnemonic instruction on how to improve reading of learners with reading problems, revise the policy that reading is tested from grade one, instead of from grade three, and training of teachers on using both interventions to teachers so that they have the knowledge of how to teach the diverse learners in their classes.

Limitations of the study

In any study of this nature, it is inevitable to encounter limitations. Below, follows a discussion of the limitation experienced during the data collection of this study. One of the limitations was language barrier since effective communication was limited. The parent participants who took part in interviews as well as those who responded to questionnaires, could not also communicate using English used by the researcher. To curb this limitation, the researcher resorted to using the local language, XiTsonga since she at least was able to use it for communication purposes.

Bibliography

1. Akinsola, M.K., & Odeyemi, E. O. (2014). Effects of mnemonic and prior knowledge instructional strategies on students' achievement in mathematics. *International Journal of Education and Research, 2* (7), 1-14.

2. Al- Khalwaldeh, M.A., & Al-Khasawneh, F.M. (2019). The effect of mnemonic keyword strategy instruction on vocabulary retention of students with learning disabilities. *International Journal of English Linguistics / Archives, 9*(4), 21-32.
3. Amadi, E.A., & Offorma, G. (2019). Effects of two phonics instructional modes on English as second language learners' achievement in reading. *ResearchGate.* DOI: 10.22158/selt. v7n2p236
4. Ballhysa, N. & Flagler, M. (2011). A Teachers' Perspective of Inclusive Education for Students With Special Needs in a Model Demonstration Project. *Academicus International Scientific Journal*, 3, 121-133. https://doi.org/10.7336/academicus.2011.03.08
5. Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of research in Nursing*, *25*(8), 652-661 DOI:10.1177/1744987120927206.
6. Cioca, L., & Nerisanu, R.A. (2020). Enhancing creativity: using visual mnemonic devices in the teaching process in order to develop creativity in students. *Sustainability, 12*(5), 1985; https://doi.org/10.3390/su12051985
7. Critchfield, T.S., & Miller, J.R. (2017). Editorial: Are theories of reinforcement necessary? *Behavior Analyst, 40*, 11-16 httpd://doi.org/10.1007/s4061-017-0113-x
8. de Vocht, F., Katikireddi, S. V., McQuire, C., Tilling, K., Hickman, M., & Craig, P. (2021). Conceptualizing natural and quasi experiments in public health. *Bio Med Central medical research methodology*, *21*, 1-8.
9. Dean, J., Pascoe, M., & le Roux, J. (2021). Information and communication technology reading interventions: A scoping review. *Reading and Writing-Journal of the Reading Association of South Africa, 12*(1), 1-10*.*
10. Dwarika, V.M. (2019). Positive behavior support in South African Foundation Phase Classrooms: Teacher Reflections. *South African Journal of Childhood Education, 9*(1), 1-10.
11. Fasih, P., Izadpanah, S., & Shanahvaz, A. (2018). The effect of mnemonic vocabulary instruction on reading comprehension of students. *International Journal of Applied Linguistics & English Literature, 7(3),* 49-59.
12. Fatima, R.S. (2020). *The effectiveness of mnemonic technique to improve students' English vocabulary at the eighth Grade of SMP Negeri 6 Parepare*. http://repository.iainpare.ac.id/1449/
13. Handley, M.A., Lyles, C.R., McCulloch, C., & Cattamanchi, A. (2018). Selecting and improving quasi-experimental designs in effectiveness and implementation research. *Annual Review Public Health 39*: 5-25. Doi: 10.1146/annurev-

publhealth-040617-014128 Epub 2018 Jan 12. PMID:29328873; PMCID: PMC8011057

14. Iwahori, M., Oshiyama, C., & Matsuzaki, H. (2022). A quasi-experimental controlled study of a school-based mental health program to improve the self-esteem of primary school children. *Humanities Social Sciences Community*, *9*, 148-157. https://doi.org/10.1057/s41599-022-01156-x
15. Jurowski, K., Jurowska, A., & Krzeczkowska, M. (2015). Comprehensive Review of mnemonic devices and their applications: State of the art. *International e-Journal of Science, Medicine, and Education, 9*(3),4-9. URl: http://iejsme.imu.edu.my/open access/c1428205512707
16. Lubin, J., & Polloway, E.A. (2016). Mnemonic instruction in science and social studies for students with learning problems: A review. *Learning Disabilities: A Contemporary Journal, 14* (2), 207-224.
17. Mahdi, H.S., & Gubeily, M.A.I. (2018). The effect of using bizarre images as mnemonics to enhance vocabulary learning. *Journal of Social Studies, 24*(1),113-135. https://doi.org/10.20428/ JSS.24.1.5
18. Makau, P.M., Muola, J.M., & Amukowa, W. (2019). Appropriateness of mnemonic techniques on mathematics and social studies learning outco mes in public primary school in Machakos Sub-County, Kenya. *International Journal of Academic Research in Business & Social Sciences, 9*, 990-999.http://hrmars.com/index.php/pages/detail/IJARBSS
19. Marthila, L. (2020). The *effectiveness of using mnemonic technique in teaching vocabulary mastery at the first semester of the seventh grade of the SMP N 2 Baradat in the academic year of 2019/2020* (Doctoral dissertation, UIN Raden Intan Lampung).
20. Miller, G.A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review, 63*(2), 81-97. https://doi.org/10.1037/h0043158
21. Oso, W. Y., & Onen, D. (2009). *A general guide to writing research proposals and report: A handbook of beginning researchers* (Revised Edition). Jomo Kenyatta Foundations: Nairobi, Kenya.
22. Othman, W., Mohammed, O., & Kayode, B.K. (2019). Investigating the impact of mnemonic-based instructions on Saudi University students' attitudes towards vocabulary learning. *International Journal of English Language Education, 7*(2),13-10. DOI: https://doi.org/10.5296/ijele.v7i2.15339
23. Overskeid, G. (2018). Do we need the environment to explain operant behavior? *Frontiers in Psychology, 9*, 302037. DOI: https://doi.org/10.3389/fpsyg.2018.00373.

24. Pattern, B.M. (1990). The history of memory arts. *Neurology 40*(2): 346-52. DOI: 10.1212/WNL.40.2.346. PMID: 240529 PMC7735988
25. Rafi, A., Ansar, A., & Sami, M.A. (2020). The implication of positive reinforcement strategy in dealing with disruptive behavior in the classroom: a scoping review. *Journal of Rawalpindi Medical College 24* (2):173-179. DOI: https://doi.org/10.37939/jrmc. v24i2.1190
26. Schunk, D. (2012). *Learning Theories: An Educational Perspective (6th ed.).* Boston: Pearson Education, Inc/Allyn & Bacon.
27. Scruggs, T. E., Mastropieri, M. A., Berkeley, S. L., & Marshak, L. (2010). Mnemonic strategies: Evidence-based practice and practice-based evidence. *Intervention in School and Clinic*, *46*(2), 79-86. https://doi.org/10.1177/1053451210374985
28. Shaw, S.C.K., Hennessy, L.R., & Anderson, J.L. (2022). The learning experiences of dyslexic medical students during the COVID-19 pandemic: a phenomenological study. *Advances in Health Sciences Education Theory and Practice, 27*(1), 107-124. doi:10.1007/s10459-021-10074-7
29. Siegel, L. (2017). *The effectiveness of the mnemonic keyword strategy on math vocabulary learning for students with learning disabilities*. Thesis, MA Special Education, Rowan University.
30. Skinner, B.F. (1953). *Science and human behavior.* New York: Free Press.
31. Skinner, B.F. (1957). *Verbal behavior.* Appleton-Century-Crofts. https://doi.org/10.1037/11256-000
32. Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics (4th edition).* Boston, MA: Allyn and Bacon
33. Whitescarver, E.L. (2018). *Effect of mnemonics on the vocabulary acquisition and retention of high school students with learning disabilities* [Theses and Dissertations, Rowan University.

© Academicus™
DP13193-DP13194 28-2010 Academicus International Scientific Journal
International Trademark Classification under the Nice Agreement

Creative Commons License CC-BY-NC
Effectiveness of Mnemonic Instruction in Enhancing of Reading Ability Among Grade Three Learners with Dyslexia in Two Primary Schools in South Africa
by Lilian Zindoga, Peter JO Aloka
is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Presented: November 2023
Included for Publishing: December 2023
Published: January 2024 , Volume 14, Issue 29 Academicus International Scientific Journal