

Influence of Shaping on Enhancement of Reading Abilities among Pupils with Dyslexia in Kenyan Primary Schools

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Abstract The study investigated the influence of shaping on enhancement of reading abilities among pupils with Dyslexia in Kenyan primary schools. The Solomon Four Research Design was used. The target population comprised 8978 pupils, 4 guidance and counselling teachers. The sample size for the study consisted of 229 pupils, 54 English language teachers and 4 guidance and counselling teachers. The reliability coefficient of the questionnaire was ascertained using the Cronbach's alpha with an internal consistency ranging from shaping 0.673 to modeling 0.807. In analyzing qualitative data, the study used thematic analysis while descriptive and inferential statistical techniques were used to analyze quantitative data. The inferential statistics used included ANOVA, simple and multiple regression analysis. Validity of research instruments was ensured by expert judgment by university supervisors. SPSS statistical Package was used in data analysis. There was a statistically significant positive relationship between shaping and reading abilities (R square= 0.109). The study recommended that teachers should use these behavior modification practices to improve dyslexic learners reading ability.

Keywords Shaping, Enhancement, Reading Abilities, Pupils, Dyslexia, Kenya, Primary Schools

1. Introduction

Dyslexia, a language based disorder affects word recognition, inaccurate reading, spelling and writing (Peterson & Pennington, 2012). Dyslexia was first discovered by Oswald Berkhan in 1881. Rudolf Berlin named the condition Dyslexia in 1887 associating it with difficulty in reading and writing. Morgan (1896) first called it congenital word blindness but, in 1896, he too adopted the term Dyslexia. The International Dyslexia Association (IDA) 2017, described it as a specific learning difficulty in which learners have problems with poor spelling and decoding abilities. The term is derived from the two Greek words 'dis' meaning difficulty and 'lexia' meaning words (Berninger & Wolf, 2009). Based on the identification technique used in a specific country, different terms are used to refer to Dyslexia in different parts of the world. The North American countries refer to it as learning disability or specific learning disability; whereas, in the UK and Australia, specific learning difficulty is preferred. In New Zealand, on the other hand, reading disability is the term found in common use. Ondieki (2013) defined dyslexia as

an impairment that interferes with the fluency and accuracy when a person is reading and spelling words. The Kenya dyslexia organization states that Dyslexia is a neurologically-based language deficiency which interferes with the acquisition and processing of language (IDA, 2017). They attribute it to brain injury or infection which occurs on the brain either before, during or after birth and affects the neuro-motor system of the child leading to problems in perception, intelligence and expressive behavior. While some countries based their definitions based on IQ achievement scores, others based it on standardized tests or other indicators as outlined by Kelly and Phillips (2016).

In Germany the identification was based on spelling issues (Roleske, Ludwig, Neuhoff, Beeker, Bartling, Bruder, Schlte, 2009). According to Cortile (2011), 15%-20% of the population struggle with language and 70-80% of them have problems in reading. Griffin and Murtagh (2015) stated that reading skills are vital for the mature functional adult. A learner who doesn't know how to read and write may develop into an illiterate adult, and this may affect the economy of a country. Reading is a helpful tool in every area of the academic circle. Lack of proper mastery of the skill can affect areas in language which involve reading and writing as well as mathematics. This is because the learner needs to read, comprehend and apply whatever information they have got from the context to problem solve.

In Kenya different methods are employed to make a learner master reading. These are look and say, whole word reading and phonetic methods (Marima, 2015). Look and say

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involves looking at the picture and saying what the picture stands for, whole word reading involve reading the whole word after the teacher sounds the word. Phonetic method involve reading the sounds of letters and matching them to what each letter stands for. Teachers use different approaches to teach reading depending on their training. The ability of a learner to read well is dependent on other factors and skills taught at school:-reading, speaking, listening and writing. English plays a key role as a media of instruction and in the development of reading as the language is used to examine various subjects in the school curriculum. Despite reading being taught in the English subject from the grade one of primary school in Kenya to standard eight, many primary school learners are still unable to answer English language comprehension questions effectively. Lack of proper mastery of the skill will make them not perform well in subjects involving a lot of reading. Poor reading skills can be an indicator of presence of learning disabilities as dyslexia. According to Cassidy (2015), dyslexic learners can reach their full potential if remediated early as dyslexia is not a disability.

Dyslexia not only affects the learner's ability to read, write or spell. It also affects one's ability to deal with mathematical calculations. Since most dyslexics struggle with language, learners might also struggle in identifying and interpreting numbers and sounds. Most are not able to achieve the right reading behavior at the right time hence the need to introduce modification practices to help them strengthen their reading behavior. Dyslexia intervention requires teachers to provide instructional practices using phonics and phonological awareness (Snowling & Hulme, 2012). Similarly early identification of the condition ensures that the students get help early. Denton and Otaib (2011), Posited that lack of proper reading skills lead to school dropouts and delinquents because when learners struggle to read they end up lagging behind others at school. This can occur when a learner is struggling to read, he/she may avoid tasks related to reading which may then impact in low exposure to books hence less reading. Thus when this is not remediated in time we end up with school drop-outs. Melinda, Gina and Segal (2013) assert that learning disability does not manifest single-handedly. It can co-occur with dysgraphia (problems with writing), dysorthographia (problems with spelling) and dyscalculia (problems with arithmetical calculation). They also stated that a child's Math ability was affected by language difficulty as the language difficulty interfered with sequencing, memory or organization. Moreover, the dyslexics fear reading aloud too (Letchumy, 2010). Due to the weaknesses which arise from poor reading, writing, speaking, listening skills or mathematics ability, dyslexics may feel shy and insecure about themselves. This may make them lack of confidence as they read and stutter thus affecting their self- esteem; especially when they are asked to read in front of a group. Ability to read involves an interplay of factors. Cognitive, motivational and psychological factors as well as

socio-cultural factors (Cartwright et al, 2016). Due to the experiences they have had in school, dyslexic learners can also feel very shy because of emotional stress as a result of their reading inadequacies.

In Kenya, it is estimated that 38.5% of the population are illiterate. Approximately 61.5% of the population can perform reading and writing tasks. According to a research conducted on literacy levels by Uwezo Kenya (2010), 50% of the class 8 pupils could barely read. Similarly half of Standard 4 learners could not read story books meant for Standard 2. The report also indicated that a third of the children in Standard 2 could not read even a word while only a third could read a paragraph of their level (Uwezo, 2010). The report also indicates that only half of the children in Standard 1-8 aged 6-16 years have acquired the highest numeracy competency expected of Standard 2 learners. These views are supported by Piper and Mugenda (2012) by stating that 4.9% and 3.3% of first- and second-grade learners in urban and peri-urban counties in Kenya have acquired skills in oral reading and comprehension in English and Kiswahili. Researches done in various African countries as Tanzania and Uganda have expressed a concern in the reading habits among primary school children. From the aforementioned researches 92.3% of class 3 pupils in Tanzania cannot effectively read a class 2 textbook. Similarly in Uganda 98% of class 3 pupils cannot effectively read a class 2 textbook. Dyslexic learners appear normal as any other learner. In Kenya approximately one out of every six disabled children attend school. Those in regular schools face several challenges like stigma, exclusion, lack of appropriate curricular and lack of teachers trained to handle their disabilities (SNE, 2009).

A few studies conducted in Kenya by Ondieki (2013), Kiongo (2013), Runo (2010), Cheruiyot *et al* (2015), are in agreement that dyslexic learners are found in public primary schools in Kenya. This research was informed by the Skinner's theory of reinforcement. The theory was founded by Skinner (1957) as cited in (Skinner, 2011). This theory is one of the theories which are used for behavior modification. Skinner's reinforcement theory attempts to explain how behaviors of organisms are acquired and modified to improve a certain behaviour. Skinner believed positive reinforcement was more useful in modifying and reinforcing an already existing behavior than when punishment was used. Reinforcement refers to an action which increases a desired behavior (Reeve, 2009) and can be positive or negative. A behavior that brings about a consequence is called operant behavior. Operant conditioning operates on the premise that learners associate a behavior with the outcome of the behaviour in an environment.

Choo (2010) carried out a study investigating the shaping of childcare and pre-school education in Singapore. The study found no statistically significant relationship between use of shaping and teacher practices in the four groups. There were no significant changes in the methods used in the classrooms. In another study in the U.S.A. Fonger and Malot

(2018) investigated use of shaping to teach eye contact in autistic children. The study findings established that use of shaping was effective in teaching young children with Autism (ASD). In Indonesia, Nasa, Pudjiati and Aswanti (2017) examined the application of shaping technique to increase on task behavior in children with Attention Deficit Hyperactivity Disorder (ADHD). The study findings established that shaping technique can increase the duration of on-task behavior in children with Attention Deficit Hyperactivity Disorder (ADHD). In the UK, Maine (2016) did a study to determine the effects of guided shaping on the reading comprehension of struggling, average, and accelerated readers. The study found shaping to improve reading outcome. In the present study, shaping as a behavior modification method together with modeling, coaching and prompting were investigated. Okafor (2016) also carried out a quasi-experimental study to investigate the effect of shaping technique in reducing lateness among secondary school students in Nigeria. Results showed that shaping was very effective in reducing the number of days of lateness in school and magnitude of lateness.

A study done in Denmark by Andersen, Holmberg, Ingolt, Ersboll and Tolstrup (2018) investigated effect of shaping the social on preventing drop-out rates in a vocational Education. Another finding was that the intervention was spearheaded by School wellbeing and connections. The study found no significant mediation effects for student support, teacher relatedness, and valuing the profession. Mc Clung and Morris (2014) in the U.S.A, investigated influence of shaping on behavior change through use of rewards. The study established that rewards were effective in motivating the students to work hard. Majchrazak, Wagner and Yates (2013) in the U.S.A, investigated the effects of shaping on knowledge reuse for organizational improvement with Wikis. The study findings established that shaping is affected by three knowledge resources which include adding domain knowledge to a Wiki. Kumburu (2011) conducted a study on shaping to investigate the effectiveness of short-term literacy skills on children having reading and writing difficulties in Tanzania. The study found a statistically significant positive correlation between the short-term literacy interventions on the learners reading skills. In South Africa, Lesey, Mandende, Makgato and Cekiso (2018) investigated influence of school environment in shaping reading ability among dyslexic learners. Results indicated that public school environment were not effective in shaping reading ability among the dyslexic learners as they didn't feel safe in mainstream schools due to mistreatment and labeling by their non- dyslexic peers.

2. Research Methodology

The study used the Solomon four research design.

The Solomon Four group design is a standard pretest-posttest two group design with a posttest only control design, an 'upgraded version' of the quasi-experimental

design involving a comparison of four groups instead of two groups employed in the quasi-experimental approach. The Solomon Four design is illustrated in figure 1.

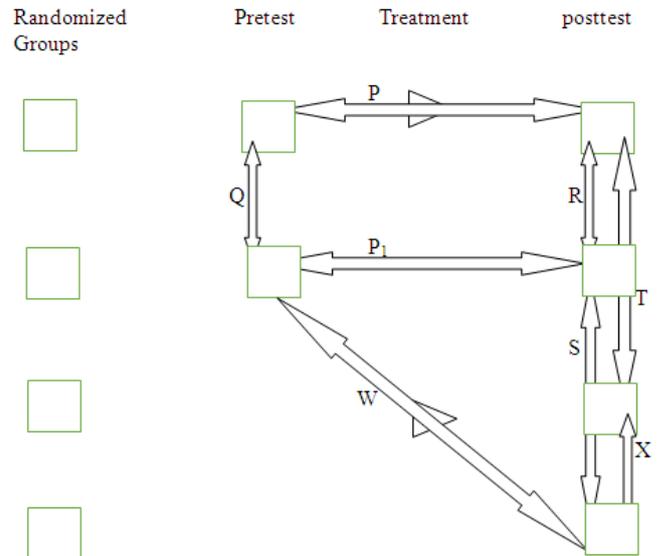


Figure 1. Solomon Four Group Design

The design involved the collection, analysis of both quantitative and qualitative research methods within a single research study in order to answer research questions. Mixed methods are especially useful in understanding contradictions between quantitative results and qualitative findings. Mixed methods give a voice to study participants and ensure that study findings are grounded in participants' experiences. Such studies add breadth to multidisciplinary team research by encouraging the interaction of quantitative, qualitative, and mixed methods scholars. Finally, mixed methods have great flexibility and are adaptable to many study designs, such as observational studies and randomized trials, to elucidate more information than can be obtained in only quantitative research. The data was collected in two phase's namely pre-test and post-test phases. The sample size was subdivided into four groups. In the first group (experimental 1) pre-test was given to test the reading ability of the learners. These learners were given intervention using the selected behavior modification practices. After the intervention the learners were given a post- test to find out if there were any changes in the reading ability of the learners after being attended to using the selected behavior modification skills. In the second group (control) pre -test was given and a post -test to check if a pre-test had an effect on their reading ability. In the third group (experimental 2) no pre-test was given, training was given and a post test was given. In the fourth group (control) there was no pre-test, no intervention but a post-test to check if they can read the words in the reading test effectively. The population will consist of 8978 pupils in Classes 5 up to 8 and 387 teachers in the 20 schools (Changamwe, 2016). Out of these, 3267 pupils and 54 English language teachers from seven schools were

purposely selected to form a target population. The researcher randomly selected 7 public primary schools with a population of 3267 pupils and 54 English Language teachers from a population of 8978 pupils in 20 schools. Four guidance and counseling teachers were also sampled.

Teachers helped the researcher in the initial screening of pupils with Dyslexic characteristics using the tool from Hardin, Simmons University. This was done after a short induction of the teachers by the researcher on dyslexia and its characteristics. The researcher also trained four data collection assistants who helped in conducting the reading comprehension and writing test. The researcher then rescreened those identified with dyslexic characteristics with the same tool from Hardin Simmons. Those confirmed to have the dyslexic characteristics were then screened using a Bangor Dyslexia Test (Miles, 1997). The reading performance of pupils listed to be having dyslexic characteristics were then extracted and recorded. In addition, the researcher gave a short reading comprehension test to assess pupils' reading ability and a writing test to assess the pupils' ability to organize ideas.

Internal validity of the constructs was tested by subjecting the survey data to suitability tests using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO Index) and the Bartlett's Test of Sphericity (Creswell, 2014). Indicates that Bartlett's test for Sphericity are significant ($p < 0.001$, $p = 0.000$) and Kaiser-Meyer-Olkin indexes

are all $> .6$ for all the subscales of the questionnaire. Consequently, based on the results, it was appropriate to conclude that the data were of adequate internal validity hence it was suitable for further analysis. All the sub-scales met the required level of internal consistency of reliability, with the Cronbach's alpha values ranging from a low of 0.673 (shaping behaviour questionnaire) to a high of 0.807 (modeling behaviour environment).

3. Results & Discussions

The study investigated the influence of shaping behavior modification practice on reading abilities among pupils with Dyslexia in public primary schools in Changamwe Sub-county. The null hypotheses was stated as follows:

H₀₂: There is no statistically significant influence of shaping behavior modification practices on reading abilities among public primary school pupils with dyslexia in Changamwe sub-county.

Therefore, the null hypothesis was tested using a hierarchical linear regression analysis. The responses on shaping behavior modification practice used as the independent variable, while the pupils score on posttest exams was used as the dependent variable. To remove the effect of group of the respondents, a hierarchical regression analysis was run in SPSS as shown in Table 1.

Table 1. Model Summary - Shaping Behavior Modification Practice on Reading Abilities among Pupils with Dyslexia

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.330 ^a	.109	.104	10.004	.109	24.603	1	202	.000
2	.532 ^b	.283	.275	8.997	.174	48.742	1	201	.000

a. Predictors: (Constant), Group

b. Predictors: (Constant), Group, Shaping behavior modification practice

In Table 1, the variable in block 1 is the group of the respondent which the study controlled for, while block 2 represents the predictor variable (the level of shaping behaviour practices) together with their interactions and the control variable. It is evident from Table 4.8 that respondent group alone accounted for 10.9%, as signified by coefficient of $R^2 = .109$, of the variation in reading abilities among the primary school pupils. Qualitative data obtained in this study gave support to the above finding, as one student said,

"Based on my experience with my teachers at school, I feel that when the teacher guides me to differentiate and put together sounds of words as I read them provides a better learning environment because it recognizes me as a human being who has potential to learn. Moreover, the special guidance helps me develop a positive self-concept" (PPL5FGD1)

"Shaping was helpful in the support of dyslexic learners as it provided a ground for building a working relationship". (GCT1)

From PPL5FGD1 and GCT1 the concept of nurturing occurs. Similarly, the manifestation of such symptoms include a child friendly atmosphere which is vital for learning to take place. It is worth noting that an environment which is harsh and uninviting to learners can result in interference and resentment with the basic thinking processes which eventually leads to low reading ability and academic achievement per se. This finding is supported by Andersen, Holmberg, Ingolt, Ersboll and Tolstrup (2018) in Denmark who reported that school dropout rate is affected by the School wellbeing and connections.

However, after the aspects of level of shaping behaviour practices were included in block 2, it is evident that the model as a whole explained 28.3% ($R^2 = 0.283$) of the variability in reading abilities among the primary school pupils. R^2 Change (.174) in block 2, indicates the amount of variances accounted for by level of shaping behaviour practices above that explained by the control variable (respondent group) was removed. This implies that the level of shaping behaviour practices alone accounted for

17.4% of the variability in reading abilities among the primary school pupils after the effect of the group of the respondents has been statistically removed. Further, the Sig. F Change value = .000 < .001 indicates that the addition of the level of shaping behaviour practices has statistical significant contribution to the prediction of reading abilities among the primary school pupils with dyslexia.

Qualitative findings revealed a theme of self- confidence improvement. Self- confidence is a feeling of capability. Self -confidence makes learners to desire to read or go to school. one student reported that:

“Observing other learners reading properly was frustrating. This made me feel less able than other learners in class. This was more so when there were new words introduced and the teacher helped me to read them out, however with practice I began improving and can read a few words.” (PPL6 FGD1).

The CSO added:

Due to the daily curriculum demands dyslexic learners may find challenges handling school subjects. As a teacher it is important that sometime be spared to

guide them step by step in reading so that they don't lag behind in class. Through doing this they will gain confidence in reading. However this may prove a challenge due to available class time allocation and big classes” (CSO).

This finding is supported by Senan, Edwards, Khan and Vilasini (2018) in India who reported a positive effect of shaping on acquisition of physics attitudes. The finding is also supported by Altin and Saracaloglu (2018) in Turkey who examined the effect of reading comprehension instruction on shaping knowledge and attitudes towards English lessons and found out that reading comprehension instruction supplemented with traditional materials positively changed the learners' vocabulary knowledge and attitudes towards English lessons. Therefore shaping can be used as a predictor of self- confidence and behavior modification.

However, to determine whether the model was a significant predictor of reading abilities among the primary school pupils with dyslexia, Analysis of Variance (ANOVA) was computed as shown in Table 2.

Table 2. ANOVA –Influence of Shaping Behavior Modification Practice on Reading Abilities among Pupils with Dyslexia

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2462.461	1	2462.461	24.603	.000 ^b
	Residual	20217.828	202	100.088		
	Total	22680.289	203			
2	Regression	6408.358	2	3204.179	39.580	.000 ^c
	Residual	16271.931	201	80.955		
	Total	22680.289	203			

a. Dependent Variable: Posttest

b. Predictors: (Constant), Group

c. Predictors: (Constant), Group, Shaping behavior modification practice

From model 2 in the ANOVA results output reveals that, the model statistically significantly predicts reading abilities among the primary school pupils with dyslexia, $F(2, 201) = 39.580, p < .05$. This implies that the null hypothesis that *“there is no statistically significant influence of shaping behavior modification practices on reading abilities among pupils with dyslexia in Changamwe sub-county”* was rejected. It was therefore concluded that there is statistically significant influence of shaping behavior modification practices on reading abilities among pupils with dyslexia.

Qualitative findings revealed that shaping led to accuracy in reading. Reading ability involves use of the 4 skills: listening, speaking, reading and writing. Proper reading skills are important as they help a learner to carry out normal activities in and out of school, read for enjoyment or for solving problems. The ability to read is a vital tool as without it, it can lead to frustrations and low self-esteem in the learners. Success in reading depends on the attitude of the learner, prior knowledge and reading purpose. Good readers are able to recognize and use words correctly. Poor readers have difficulty in word recognition, linking prior to present

knowledge as well as the ability to interpret the meaning of a particular text. Teachers made the following statement to support the finding.

One teacher stated:

“It helps to improve accuracy in reading. In one of my lessons with the dyslexics I focused on scaffolding reading using phonics method. I modelled how to read while the learners were observing what I was doing. After a few trials the learners were able to sound out the words presented to them. Similarly when I blocked the first letter and replaced it with another letter. The learners used the same strategy to read it by sounding it out.” (TIFGD2)

One of the guidance and counseling teachers also stated:

“Coaching helped me create a positive relationship with my learners because it provided an avenue for improving the learner's perception about reading where we trusted each other to discuss the problems and identify solutions to the problems.” (GCT2)

One student added,

“Shaping helps to improve how I read. My major problem in reading was with new words and spelling, especially Pseudo words like contemporaneous. My English teacher reminded me how I had dealt with other three letter words. So when I divided this word into segments, the task became easier” (PPL5FGD1).

From the excerpts, it is evident that shaping increases knowledge among students as they undertake reading in English. This pointed out that majority of the students were able to improve the basic knowledge they had in reading. This finding agrees with the finding of Hurst (2010) who reported noticeable levels of literacy, gender and identity shaping in their learning. This finding is also echoed by Silverstein, Roche, Khan, Carson, Malinovsky, Newbill, Menditto and Wilkins (2014) in U.S.A who reported that attention shaping was found to be effective in improving attention in people with schizophrenia. The finding disagrees with that of Zwissler, Sperber, Aigeldinger, Schndler, Kissler and Plewnia (2014) in the U.S.A who found no effect of stimulation on the performance in the attention test.

Other qualitative findings revealed that shaping works with reinforcement. Reinforcement helps a learner to get focused on task. Teachers use it in a school set-up to boost performance. One learner reported:

“When the teacher teaches me how to read, at times he gives me stickers and tokens which later are counted and used to reward me” (PPL4FGD2).

From the excerpts above the pupil feels motivated because of the use of rewards system. It is evident that when one is rewarded he or she feels motivated to try harder especially in reading tasks assigned to them hence behavior is modified. Shaping requires that each stage done towards the targeted behavior be rewarded with either tokens or praise words. Similarly different methods can be used to reinforce different stages of learning or learners as learners have individual differences. This finding is in congruence with the findings of Mc Clung and Morris (2014) in the U.S.A who reported that shaping was effective in finding out what reward schedule works best for the students' on-time arrival in class. This finding however differs with that of Shaikh and Khoja (2011) in Pakistan who reported that shaping was not effective in implementing ICT use in higher education learning.

4. Conclusions & Recommendations

It was concluded that there is statistically significant influence of shaping behavior modification practices on reading abilities among pupils with dyslexia. This conclusion was based on statistical results which the study obtained from the regression analysis which revealed that shaping has statistical significant contribution to the prediction of reading abilities among the primary school pupils with dyslexia in Changamwe sub-county. The

teachers are aware that desired behavior is introduced in steps by making an approximation of the targeted behaviour. when a teacher is using scaffolding as a shaping method in reading, the teacher should look into entry behavior of the pupil and also take caution to avoid over dependency on scaffolding. The findings was further supported by the qualitative data that showed that students whose reading is guided by shaping method tend to progress towards the expected behavior. The use of mnemonics was found to be common among many of the teachers. This was confirmed by a sizeable number (mean=2.80; SD=1.14) of pupils who confirmed that their teachers appropriately uses mnemonics to help them memorize some concepts. Given that shaping behavior modification on the reading tasks was positive it can be concluded that shaping method improved the reading ability among dyslexic learners. Therefore, the curriculum developers should acknowledge and classify dyslexia as one of the learning disabilities' in Kenya. This is because cases of dyslexia were found in the public primary schools although they were not documented.

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