
**Visual Discrimination Training in the Recognition of Numbers and
Its Effects on Reading among Struggling Readers in Primary Five
Pupils within the Buea Municipality**

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ABSTRACT

This study was out to investigate the visual discrimination training in the recognition of numbers and its effects on reading among struggling readers in primary five pupils within the Buea municipality

It made use of three primary schools (government, mission and private) in a quasi-experimental study. Twenty-four struggling readers were used to verify if visual discrimination training on number recognition has any effect on their reading ability. They were selected sequentially through teacher nomination, classroom records and a standard oral reading test. The 24 most severe cases were subjected to ballot to distribute them into two groups (experimental and control). Each group had 12 participants including boys and girls between the ages of 10 -11years. The pre-test-post-test techniques were used to measure the progress made by each group within a period of 8 weeks. Only the experimental group received the treatment exercise. The instruments used for data collection were a master sheet for reading assessment, test score sheet produce by the researcher, an interview guide for pupils and their teachers. Data were analysed using the statistical package SPSS 21.0. They were analyzed and presented descriptively using frequencies, percentages, tables and charts, while hypotheses were tested using the Chi-Square test of equality of proportions comparing the aggregated scores of the experimental and control group. Interviews were analysed using the thematic and case approach, and summarized in code-grounding-quotation tables. Results revealed that, there was a significant positive progression in the experimental group. The progression stood at 20.8% as against 4.2% in the control group. Based on this, the null hypothesis was rejected while the alternative was retained. This implies that visual discrimination training has a positive effect on reading among struggling readers. This knowledge will lead to improvement in pedagogic practices in primary schools. The study therefore recommends that visual discrimination training be introduced as earlier as possible, and reinforced in all classes in primary schools to give all children the possibility to improve.



KEY WORDS: Visual ,Discrimination ,Training , Recognition , Numbers , Effects ,
Reading , Struggling ,Readers ,Primary ,Pupils , Municipality



Introduction

Reading is an important component of the school curriculum, which determines the extent to which learners achieve academic competence and develop a positive self-esteem. It is a left brain activity which is often difficult to the right brain dominant learner.

Visual discrimination training is an intervention technique used in teaching to enable struggling readers recognise similarities and differences in print. Struggling readers are unable to read their notes and other age appropriate literature. This affects their academic achievements with negative consequences on their families the educational system and the larger community. Primary five pupils ought to read to cope with the workload in public examination the following year. Children in any given classroom come from different backgrounds with varied strengths, weaknesses and aspirations based on their exposure and hereditary factors. Some before schooling have been exposed to books with reading models at home. Others receive assistance with their school work from home teachers, parents and siblings who reinforce what was taught in school. While others who come from poor and underprivileged background, including hereditary factors rely solely on the school to provide them with the necessary support to enable them to read. Literature reveals that some struggling readers could be very intelligent but experience difficulties with reading requiring remedial instruction to be able to read. Teachers through training ought to understand their pupils, their characteristics, their socio cultural environment and the nature of reading to be able to help children with disabilities (struggling readers) in their classrooms and schools. They ought to be able to identify learners by their strengths and weaknesses and then focus on their strength to help them develop skills and eventually their full potentials for a healthy personality. Several efforts have been

made by the educational system to adjust pedagogy practices to bridge the gap between proficient and struggling readers in Cameroon yet some children graduate or drop out from school without being able to read. My assumption is that more struggling readers will be able to read by primary five if provided with early and appropriate differentiated instruction. The purpose of this study is to investigate if visual discrimination training on the recognition of items has any effect on reading among struggling readers in primary five in the Buea municipality in Cameroon. This chapter is focuses on the background to the study, the statement of the problem, the purpose of the study and research questions. The research hypothesis, significance of the study, the scope of the study and definition of terms were also examined.

Statement of the Problem

This study was out to investigate the visual discrimination training in the recognition of numbers and its effects on reading among struggling readers in primary five pupils within the Buea municipality

Field observation reveals that struggling readers in primary five are often excluded in the learning the recognition of numbers. Struggling readers are often labelled as dull, stupid, lazy, slow learners and good for nothing children, though they may be very intelligent but experience difficulties with reading. This has negative consequences on the learners their family the educational family and the larger community. The few pupils who could read are often asked to read without any effort to motivate struggling readers to read. The classroom environment on their part is often not literacy friendly to help motivate those from poor and underprivileged home background to have materials to read.

Several literatures exist in Cameroon stating the different methods that could be used in teaching children how to read yet some children keep struggling with reading. To the best of my knowledge, no literature exists in Cameroon on how to assess struggling readers to determine why they struggle with reading before providing the remedial instructions. This study may give direction to the quality of instruction that is required to help struggling readers read. It is against this backdrop that this study sought to investigate the effect of visual discrimination training on reading among struggling readers in primary five.

OBJECTIVE

To verify the effect of visual discrimination training in the recognition of numbers on reading among struggling readers in primary schools in Buea municipality in Cameroon.

Research Question

How does visual discrimination training in the recognition of numbers affect reading among struggling readers in primary five?

Research Hypothesis

Visual discrimination training in the recognition of items has no impact on reading among struggling readers in primary five.

H₀₃. There is no effect on reading due to visual discrimination training in the recognition of numbers among struggling readers in primary five.

H_{a3} There is effect on reading due to visual discrimination training on the recognition of numbers among struggling readers in primary five.

BACKGROUND



Visual discrimination enables a learner to see minute details in his or her environment and in print. This affects the way children learn to read. A child with visual discrimination difficulties with numbers and mathematical concepts will have difficulties to distinguish between different numbers, symbols and numerals (School Sparkson, 2013). They argue that this affects the way these children respond to mathematical computation. And that numbers with similar formation such as 1 and 7, 2 and 5, 6 and 9, 3 and 8 etc. will often confuse them. They contend that such children also get confused with mathematical symbols like (+ and x, - and multiplication sign) and that this affects the way they solve problems in Mathematics. They argue that when such children are asked orally what $1+3$ is they can easily respond appropriately. But if asked in written form, they will get confused. This is because they experience visual discrimination difficulties and cannot properly distinguish between all numerals.

They emphasize that children with visual discrimination difficulties equally face problems with double-digit numbers. And that when faced with double, triple or quadruple digit they do not easily identify the numerals correctly. They can hardly process such digits in their correct order from left to right. For example, 18 is often confused as 81 though they represent different amounts. This is same with 75 and 7.5, 17 and 71 etc. They also commend that such confusion goes same with visual similarities between 10, 100, 1000, 10000 and 1000000.

Rongione(2000) contends that the teaching of visual discrimination of numbers is often reduced to counting of numbers, which does nothing to help children neither recognize numbers nor understand concepts. As a result, struggling readers easily get confused with similar looking numbers. For example, they get confused between 6 and



9,1 and 7, and 2 and 5. She stresses that to help them recognise these numbers; it is necessary to draw their attention to the similarities and differences in confusing numbers and also teach them the numbers with objects. Furthermore, she emphasizes that struggling readers get confused with 12 and 20 because they are both written with "tw" at the beginning of the word which requires that their attention be drawn to it. She reiterates that, pupils find difficulties with the recognition of two or more-digit number because they fail to master the position of the numbers. For example, when they come to the tens, they need to master the tens are the first to be introduced in order to avoid the confusion

Furthermore, she emphasizes that it is necessary to stress that in the tens, the one comes first and in the twenties the two comes first just like in the thirties, forties fifties etc. She suggests that when teaching children how to count, it is necessary to count up to the number with children so that they can recognize the numbers and say what it is rather than counting and getting to the number before naming it. She proposes that for children to recognize the numbers, they should be made to practice, see, hear and deal with the number several times each day. Also, she argues that to achieve success, children should be made to do hands on activities and games. They contest that the reading disabled children have difficulties memorizing "basic" number facts in four operations. For example, instead of readily knowing that $5+7=12$ or that $4 \times 6=24$, such children continue to count their fingers, pencil strokes or scribble circles to get the answer. In addition, she argues that this is because they are unable to memorize strategies on their own to help them arrive at the correct answer. Furthermore she reiterates that non-proficient readers do not pay attention to operational signs at

borrowing or carrying approximately and at sequencing the steps in complex operations. And those children also experience difficulties mastering number facts. This implies that when teaching children how to read and write, teachers should draw the children's attention to minute details that may lead to confusion. They should also help them to come up with rules that will facilitate the mastering of basic concepts to enable them develop their visual discrimination skills.

According to Brain (2013) children with visual discrimination deficit experience difficulties recognising numbers, symbols and identifying +, -, and other signs and use them correctly. He emphasizes that such children also have difficulties writing numerical clearly or putting them in their right columns and can hardly come up with steps to solve a Mathematical problem. Besides, they struggle to understand words related to Maths such as greater than and less than. And that they have a poor sense of direction and also face difficulties telling time. This implies that when teaching children how to read, their attention must be drawn towards the similarities and differences of items to help them recognise the items and read better. This implies that struggling readers have visual discrimination difficulties because they are unable to differentiate items. This is in line with the research carried out by Woodrome and Kethey (2009), on the role of visual discrimination in the development of letter identification in the learning to read process. This implies that non-proficient readers experience reading difficulties because of the structure of their magnocellular system of the brain. Thus, they must be assisted to read by assessing them and providing them with the appropriate remediation instruction so that they too can become proficient and succeed in school.



Struggling readers require remedial intervention to enable them acquire reading skills over time. According to Burns *et al* (1996) struggling readers need more individualised attention, rather than they would receive during normal classes. They argue that this category of persons require highly specialised techniques and instruction based on the diagnosis of the problems. Richet, List and Lerner, 1989) as in Burns *et al* (1996). contend that such learners need opportunities to develop positive attitudes towards reading and to build positive self-esteem.

According to Torgessen, Houston, Rissman and Kosanavich (2007), the most important goal of reading instruction is to help the children acquire the skills and knowledge they need at grade-level, text fluency and with good comprehension. And that although reaching instruction changes from level to level. Three important elements are necessary at all grades. Besides, they contend that teachers at all grades must provide instruction in critical skills and knowledge to all learners in class, to ensure that learners meet the grade level standards of reading. In addition, they argue that to achieve success, teaching must be skilfully systematic and explicit. Furthermore, they emphasize that teachers must work with small groups of learners who have different instructional needs to reach their individual needs. More so, they stress that teachers should diagnose individual needs and plan for appropriate remedial instruction, focus on the child's needs and instructional routines.

In addition, they emphasize the use of children performance data to guide instruction and allocate instructional resources. Also, they argue that such data should provide valuable information to help the adapt instruction for individual learners. More so, they commend that teachers should use valid and realizable assessment in reading



programmes that will provide key information to help the teacher adapt instruction for individual learners. Besides, they commend that teachers should use a variety of teaching strategies and instructional devices that will provide opportunity for pupils to practice.

According to Hiebert and Taylor (1994); Johnson and Allington(1991);Pikulski(1994);Pinnell,(1991) as in Torgessen *et al* (2007), emphasis should be on preventing rather than correcting reading difficulties. They stress that earlyintervention over a long period provides more effective results than correction in later times. They emphasize that such programmes should depend on the learners' progress. Torgessen *et al* (2007), recommend that there are two intervention programmes for pupils with reading difficulties. The reading recovery programme where a trained tutor works with each child for 30 minutes for a period of 12-16 weeks until the child can develop independence to learn in the general classroom. While the success for all programmes provides an enriching curriculum for the whole school with excellent instruction in reading. This is an intensive one to one tutoring programme for pupils if reading problems emerge. The pupils are grouped in difficulties and teaching levels across the grades for 90 minutes' instruction on reading. They emphasize that the reading teacher tries to find out the reading difficulties and employ different strategies to help pupils read and with the parent of the child involved to provide special services. They however argue that reading problems can be prevented in primary schools if difficulties are identified and the necessary interventions provided.

However, the practice in primary school in Cameroon is that even when reading difficulties are identified, teachers will hardly create time to tackle them because they



are more concerned with syllabus coverage rather than providing remedial lessons for the development of skills and competence. This frustrates the children the more especially when they are pushed to higher levels due to the policy of mass promotion without remediation lessons to ensure that they have acquired the necessary skills. This only helps to widen the gap between proficient and non-proficient readers in Primary schools in Cameroon.

Therefore, to narrow the gap between proficient readers and struggling readers, the classroom teachers must make an effort to vary their teaching strategies. They should make use of locally produced instructional materials in all schools irrespective of where the schools are located. This will help the children to develop interest in reading even if their parents cannot provide them with readers. This is because when the children become familiar with words that they frequently see around their classroom environment, such words will eventually become sight words for them. This will motivate them to become interested in reading because they believe they can read. Besides, policy makers must review their objectives; evaluate the curriculum objectives in order to be able to imbibe new values in teaching to meet the needs of all learners in their inclusive classrooms.

This study is out to investigate the effect of visual discrimination on reading amongst struggling readers in primary pupils. It is necessary to review what others hold in relation to the variables of the study. This will help give direction to the study. Amin(2005), holds that review of literature is a systematic identification of location and analysis of document containing information related to the research question. It helps the researcher to identify works already done in the area of interest



and to evaluate the relevance of the work to the current research. Through the reviews expressed by other authors, the researcher was guided on the right theories, hypotheses, research design and methodology that will be appropriate for the study (Fraenkel and wallen,2006).

Erikson is a social psychologist who was interested in how human life develops. In his theory of psychosocial development, he posits that human development unfolds in stages as people go through human life span. He argues that each stage consists of developmental tasks that confront individuals with a crisis. He stresses that the crises are not catastrophic but a turning points of increased vulnerability and enhanced potentials. He argues that if an individual successfully goes through each stage, he or she will be more psychologically healthy. He emphasizes that each stage has a negative and positive side that must be balanced for the individual to have a healthy personality.

Primary five pupils in Cameroon fall between the ages of 9 to 11 years corresponding to Erikson's fourth stage of psychosocial development of "industry" versus "inferiority". According to Erikson (1968), children enter primary school between the ages of 6-13years with initiative and a wealth of new experiences that direct their energy towards mastering knowledge and intellectual skills. He contends that during this period, children are enthusiastic about learning since their imagination is expansive. He argues that if children are not properly guided, they develop a sense of inferiority, unproductiveness and incompetence. He stresses that guidance should be geared towards striking a balance between the negative and positive forces to avoid crisis.



This view is supported by Allen and Marotz (2003), that the elementary school provides many opportunities for children to achieve recognition of teachers, parents and their peers by doing things, producing things, solving sums, writing and reading. They stress that this is a period for the development of potentials and competencies. They argue that if the children are motivated, praised and encouraged, they develop and demonstrate industry by being diligent, persevering at tasks until completed and work before pleasure. They emphasize that at this stage of development; children start recognizing their special interest and begin to develop interest in their education. They become aware of their improvement as well as their discouragement as they become unproductive and incompetent. They opine that at this stage of development, children begin to pursue their activities of interest, appreciating good work and poor work that makes them conscious of their own efforts. They argue that when struggling readers are ridiculed or punished for their effort or they find that they are incompetent or incapable of meeting their teachers and parents' expectations they develop a feeling of inferiority about their capabilities.

In the same light, Mcleod (2015) holds that crises occur at each stage of development that are psychological in nature. They stress that when these psychological needs of an individual, conflict with the needs of the society, problems are created for the individual's personality. He argues that children at this stage of life are learning to read and write, do sums and make things on their own. He emphasizes that, teachers should take important interest in them for they play very important roles in the lives of the children as they teach them specific skills. He commends that at this stage, peer groups gain greater significance in the child's life as a source of the child's self-esteem. He



argues that since the child within this stage needs to win their approval by demonstrating specific competences that are valued by society, they begin to develop a pride for accomplishment and inferiority for incompetence.

He emphasizes that the primary school years are years that the child begins to work hard academically and gains competence in various areas of activity. More so, that this period is a time that if a child is praised for doing and achieving, it builds a positive impact on the child's personality and that if discouraged and ridiculed, the child develops a sense of incompetence, unproductive and low self-esteem. He stresses that since adults affirm competence in the learner, they serve as a motivating force for the child to pursue an activity, value himself for achievements they may promote a sense of competence or inferiority. He argues that when teachers exclude lack of skills, lack of competence or lack of accuracy in a child's work, the child develops a sense of incompetence. He commends that it is important to help the child feel that he/she can pursue a task and do it well. Furthermore, that small learning targets that may be set in a variety of areas could be tested with a firm and consistent demand for the child to actually reach the target and show proof of learning and not just engagement. He opines that the primary school years are a time to validate the child in his or her own multiple talents and build a work of ethics.

In the same light, Tchombe (2011), in her attempt to articulate how Erikson's (1974), stages of psychosocial development can promote a healthy personality stresses that, it is important to effectively manage the socialization of children in the African culture (Cameroon). She argues that the childhood stage (7-12) has the psychosocial crisis of industry versus inferiority accompanied by the virtue of competence and a sense of



division of labour. She emphasizes that children at this stage are more aware of themselves as individuals. They try to be responsible, to be good and to do things correctly. She argues that they can share, cooperate and are very conscious of moral values capable of recognizing cultural and individual differences. She stresses that this stage coincides with the period of puberty that is marked with sexual maturity and growth spurt in physical development and that this influences the child's perception of self which needs proper management. She argues that these children can express their independence and become disobedient. She stresses that what they need at this stage is recognition and encouragement to work hard. She contends that teachers should not make them feel inferior because of too many unrealistic expectations that the child finds difficulty to achieve and accomplish. But that, they should create a conducive classroom environment to support the changes of transition.

Struggling readers in primary five (9-11years) in Cameroon fall within this age group (6-13years). They have trouble with reading and as a result, they are often neglected and labelled to make them instead feel inferior, instead of supporting them and providing them with the necessary support. The classroom environment is never conducive for them to support the changes of transition. This causes them to exhibit a variety of diverse behaviours. They skip classes, absent from school and some even drop out of school because they are unable to cope with the existing situation.

The teachers are the more skilled persons in the classroom who ought to identify these children and help them out. At this stage of their lives, the children are willing to learn, ready to cooperate and conscious of moral values. They are capable of recognizing cultural and individual differences. Thus, if the teachers make them to feel inferior,



they will not develop the zeal to learn. Rather if they are motivated and encouraged to learn, they will put in their best and will eventually acquire reading skills.

The theoretical implication of this theory is that children in primary school should be motivated to learn by presenting what they must learn in small learning targets that may be set in varieties of areas. It stresses that there should be a follow up for the child to actually reach the target and show prove of learning and not just of engagement.

Also, teachers who confirm specific competence that are valued by the society on the child should be careful in handling this task so that they do not discourage the learners but rather encourage them to develop competences. They should serve as a motivating force for the child to pursue an activity, value himself for achievement and promote a sense of competence rather than inferiority. They should help the child feel that he or she can pursue a task and do it well so that the child can be motivated to pursue the tasks or interest rather than develop a feeling of incompetence.

The practical implication of this theory is that teachers should treat struggling readers with care in order not to make them feel incompetent. They should focus on their strength and not their weaknesses to motivate them to read rather than discourage them to make them feel they are incapable of learning. This implies that a reading task provided to such learners should match the level at which they can cope and gradually proceed as they develop competence. To achieve success, teachers must be ready to assess the struggling readers and identify why they are struggling with reading and then provide the appropriate remediation lessons that will help them acquire reading skills. Besides, when children make mistakes in their attempt to read, emphases should not be placed on the mistakes to ridicule them but rather be corrected in a way that



they will learn better. Teachers should model reading lessons in small chunks, ensuring that they master the pre-requisites before they can proceed to higher levels. This will create the feeling of competence so as to motivate the child to keep trying until they are able to read. The field observation reveals that struggling readers in primary five in Cameroon are often labelled as dull, stupid, lazy and slow learners due to the difficulties they exhibit when trying to read. They are often not given the opportunity to read in class for fear of delaying the lesson. They are often ridiculed by teachers and even peers when they attempt to read and make errors. This helps to make them feel incompetent and will hardly participate in reading lessons. This attitude lowers their self-esteem as they grow ashamed for not being able to read what their peers can read. Even when remediation lessons are provided, the teachers like parents do not bother to investigate why the child is struggling with reading. They often try out lessons that end up with little or no success frustrating the pupils, teachers and their parents. This is because the lessons did not have short term and long-term objectives that could be monitored or tracked to identify if they are achieving the purpose. Thus, the need for such a study to throw light on the appropriate strategy to fulfil.

METHODOLOGY

The research design used for this study is the experimental design. Specifically the quasi-experimental type of double group pre-test and post-tests sub-type. The experimental group was consist of four participants per school who were taught for eight weeks using the participatory approach. This approach was adopted because it enabled the researcher to work with the participants in a natural classroom environment in various actives using item cards, and taking part in practical exercises

and assignments. The control group was consist of four participants per school who did not receive any intervention but continued their normal session with their class teacher. The quasi-experimental design was seen as the appropriate design because the study sought to establish the relationship that exist between the dependent and independent variable

According to Amin (2005), experimental research allows the researcher to study variables that could not ethically be manipulated by the experimenter. In this light, the researcher was able to conduct interviews with the participants and their teachers. Shuttleworth (2008), Fraenkel and Wallen(2006), and Cohen, Monion and Morrison(2007) contend that in quasi-experimental design participants are not allocated at random, but selected judgemental. This permitted the researcher together with the class teacher to nominate struggling readers in their respective classrooms. Participants were sampled through multiple stage sampling to ensure that they met the criterion for selection. They argue that quasi-experimental studies operate in a natural setting, which permits the extraneous variables that could affect the results to be controlled to reduce threads to internal validity. In this light, the researcher imposed a criterion for selection requiring that the participants must be in class must be struggling readers, must be aged 9-11 years and could be male or female.

The nominees were subjected through an oral reading test to ascertain if they were struggling readers before subjecting them to a pre-test. This was at the commencement of the experiment and a post-test after the treatment exercise that was administers only to the experimental group. This was so to enable the researcher to be able to make inferences at the end of the experiment. Both groups were tested at the same time, at

the beginning of the experiment (pre-test) and at the end of the treatment period (post-test) using the same instrument and by the researcher. They were followed-up over the same duration before the post evaluation. Data were collected directly from the participants for 10 weeks from the 18th of April to the 5th of June 2015. One week was for the selection period that included teachers' nomination, examination of class records and the standard test. The intervention period covered 8 weeks from the pre-test to the post test. The pupils and the teachers were interviewed as to have more information on the challenges they face with respect to reading over the remaining one week.

Area of the study

This study was carried out in Buea municipality in Fako Division of the South West Region of Cameroon. It is one of the sub-divisions within Fako division. This is a cosmopolitan town located at the foot of Mount Fako with 156 primary schools dispersed in the municipality. It harbours a population with varied cultural and socioeconomic background. The people are involved in all works of life. The settlement areas are carved in a triangular form accessed by road. According to (Nana, 2015; Shadish, Cook and Campbell 2000; Trochim, 2006) experimental study did not permit a simple random sampling of participants throughout the study. It requires well-demarcated geographical area purposively selected based on the nature of the study. In line with this view, three schools with three different backgrounds were selected purposefully within Buea municipality. That is, Government school Bonduma group1, C. B. C. Bolifamba mile and Bonandive academic centre Woniamavio. These schools were widely dispersed to ensure that children from different background were included in the study.

Population of the Study

This study is focused on struggling readers in primary five in Buea municipality. According to Fraenkel and Wallen (2007), the population of interest in a study is a group of people who possess certain characteristics. The target population for this study was all primary five pupils who are struggling with reading. These schools included all government schools, all mission schools and all lay private schools within Buea municipality, while the accessible population was the three schools from where the sample was drawn. That is, Government school Bunduma group1, Cameroon Baptist Convention Bolifamba mile 16 and Bonandive Academic centre Woniamavio. They were chosen through the simple random sampling method based on their category so as to give all the schools an equal opportunity to participate in the study.

Table 1: Summary statistics for primary schools on enrolment sex and class 2014/2015.

SN	School types	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Total														
1	Government	325	319	644	303	338	641	359	363	723	433	403	846	522	426	9552	383	351	734	2360	2200	13140
2	Catholic	202	197	399	219	246	465	251	252	503	274	264	538	293	314	6077	249	276	525	1515	1549	8507
3	Baptist	49	47	96	49	37	86	54	43	97	54	46	100	60	47	1077	55	44	99	309	264	1555
4	Presbyterian	62	43	105	62	74	136	51	77	128	47	56	103	77	79	1566	49	69	118	360	398	2156
5	Anglo Arabic	6	9	15	6	7	13	4	5	9	4	6	10	6	5	111	5	2	7	32	34	165
6	Lay private	944	894	1881	840	924	1754	833	900	1733	808	806	1617	740	752	14800	674	605	1279	4923	4881	23064
Total		1588	1509	3140	1479	1626	3095	1552	1640	3193	1620	1581	3214	1698	1623	33183	1415	1347	2762	9499	9326	48587

Source: Inspectorate of Basic education-Buea.

Sample Size

The non-probability sampling method was used to select the sample. This is a method where some elements of the population have no chance of being selected. The samples were selected based on the assumption that they will provide the necessary data for the study. Fraenkel and Wallen (2006) and Cohen, Moion and Morrison (2007)

Table 2: Sample Size

Category of School	Class	No in Class	Number of struggling readers	Number sampled		
				Control	Experimental	Total
Government G.S. Bonduma 1	5	26	16 (61.5%)	4	4	8
Mission C.B.C. mile 16	5	18	14 (77.8%)	4	4	8
Lay private Bonandive Academic Centre	5	17	10 (58.8%)	4	4	8
Total		61	40	12	12	24

The sample size for this study was 24 participants (18 boys and 6 girls) drawn from three primary schools (government, mission, and private) within Buea municipality. Eight pupils participated from each school. The criterion for participation was that the pupils from each school must be in class five, must be aged between 9- 11 years, must be a struggling reader and could be male or female. Out of the 61 struggling readers in the three schools, 24 of them were sampled. Class 5 was chosen because it is the last but one class in the primary school where



pupils are expected to have acquired visual discrimination skills to enable them read age appropriate literature before graduation.

According to Picciano (1996), a sample size can be determined by using sampling theories or determined by the nature of the research. Also he stresses that experimental studies could tolerate a minimal samples sizes for statistical significance to be valued and that even a school could be chosen for such studies. To buttress this point Gall and Borg (2015) states that causal comparative and experimental research methodology can tolerate a sample size of fewer than 15 participants in each group because it is out to establish the relationship that exist between the variables.

Sampling Techniques

Selection of schools

The selection of schools was done considering the nature of the study which sought to establish the relationship between variable and also following the stratified simple random sampling method. According to McMillan(1996) and Cohen, Monion and Morrison (2007) there is no precise way of generalising judgmental or convenient sample of the population considering that such studies sought to establish the relationship that exist between variable They stress that such studies could be carried out even in a single school and the results indicate the relationship. They argue that once the relation has been determined spending longer periods in the field will be a waste of time. They recommend that if there is need for generalisation same study could be carried out in different geographical areas. Three schools were selected through stratified simple random sampling whereby within each category of school was represented.

Selection of participants

Participants were selected purposively through a multi-stage screening. The first stage consisted of teacher nomination, the second stage the examination of their class records and the third stage through a standard test. During this phase, all the nominee were subjected to an oral reading test to ascertain that they were struggling readers using Gray’s Oral Reading Test (GORT-5) (Patino; 2014). This test was out to measure reading fluency and comprehension. Participants were given a short passage to read to and answer questions from the passage. The researcher to suit the level of the learners constructed the short passage. She adopted the scoring scale from Gray’s oral reading test(GORT-5 (Patinon2014).The researcher observed and followed along as each participant read. She took note on the errors, fluency, and comprehension of the passage. For each correct word the child, scored (.5) mark while comprehension was scored (2 marks).The grading was done on a scale of 20. Then, the last eight participants with the least score in each school were taken for the study.

“Dig a hole and feed the pig. He left for school and did not get to the pig .His father saw him and was happy. But did not know that he left the pig without food”.

Question

What is the passage about?

Table 3: Score sheet for oral reading Test (GORT-5)

SN	G.P.S.BondumaGroup 1 -16	C.B.C.BolifambaMile 16 - 14	BonandiveAcademic Centre- 10
1	14.5	13.5	13.5
2	14	12.5	13

3	14	12.5	13
	13.5	12	12.5
	13.5	12	12.5
4	13	12	12.5
5	13	11.5	12
6	12.5	11	11.5
7	12	11	11
8	11	11	10
9	10	10	19
10	10	9	8
11	9	8	
12	8	8	
13	7	7	
14	6	6	
15	6		
16	5		

The Participant were later divided into the controlled and experimental group at random. This process is diagrammatically represented on the sample flow chart below as in Nana (2015).

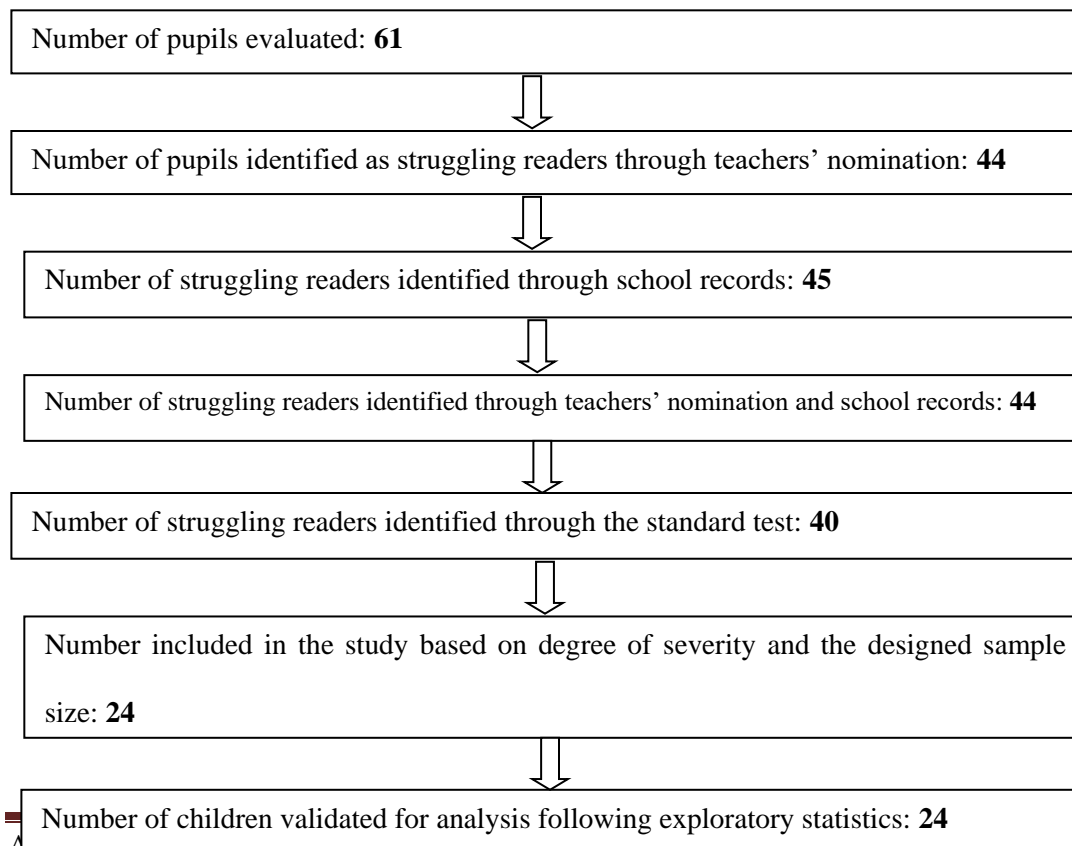


Figure 3: Summary of the Identification Process

Instrument for Data Collection

Data triangulation was employed in the study. This involved collecting data qualitatively through interviews, and quantitatively through test scores. The following instruments were used:

- A master sheet for reading assessment for pre-test, post-test.
- Test score sheets from researcher-made test that enabled the researcher to monitor the progress made by the participant in the experimental group.
- Interview guide for pupils also enabled the researcher to collect more information from the participants on the difficulties that struggling readers' experiences with reading and how they affects their personality development.
- Interview guide for teachers enabled the researcher to collect information from the class teacher as to whether they are able to recognize struggling readers in their classroom and how they meet their needs.

Validity and Reliability of Instrument

Validation of research instrument is very important to ensure that the instruments measure what they intended to measure. This was done in two phases.

Content Validity

To ensure the content validity, the research instruments were constructed and presented to a specialist in learning disabilities to ascertain whether the instruments suit the characteristics of



the learners or not. Thereafter, the same instruments were presented to the supervisor for scrutiny. This led to some modification and adjustment of some items to ensure that the objectives of the study are attained.

Face Validity

Pilot Test

The researcher carried out a pilot test with four struggling readers in G.P.S Bonadikombo mile 4 Limbe that had the same characteristics with the participants and was not part of the sample population to check for any ambiguity in content. They were nominated by the class teacher and subjected to an oral reading test by the researcher. The purpose was to ascertain their status as struggling readers. They were later assigned to the experimental and control group through simple random sampling. The researcher administered the test to the four participants. The class teacher taught those in the experimental group for two weeks using the scheme produced by the researcher for this study while those in the control group received no such treatment. After two weeks, the four participants were subjected to a second test. They were further exposed to a semi-structured interview to get more information about the difficulties they face with reading. No major discrepancy was observed and the teacher concluded that the test items were well understandable and within the level of the pupils.

Reliability of the Instruments

The test-retest reliability test was used in the study. The same test was administered (as pre-test and post-test) to the same set of respondents after intervention with the experimental group by

the class teacher. Then, the results of the two tests were compared and analysed using Cronbach's alpha with the formula:

$$: a = \frac{N.\bar{C}}{\bar{V}+(N-1).\bar{C}} \quad \text{Where } N = \text{No. of items, } \bar{C} = \text{Average inter item covariance}$$

\bar{V} = Average Variance, a = Cronbach alpha reliability

Note: the higher the item, the higher the alpha and the lower the item the lower the alpha

The progression was computed based on the differences in scores between the two tests. The evaluation was based on frequency count as follows: very mild-4; mild-3; severe-2; very severe-1; the four grading were later collapsed to two grading (mild and severe) to enable the researcher draw inferences as to whether the progression was positive or negative. That is, a participant with mild status at pre-test and very mild at post-test for instance will be considered as having progressed just like one with very severe at post-test will be considered that he or she has not progressed. Meaning that the disability has not improved.

Cronbach Alpha reliability coefficient was big enough (Alpha=0.733) implying that responses were consistent in their trend. The internal consistency assumption therefore is not violated.

Experimental Procedure

After the selection of the schools, the researcher began with the experiment. She constructed a timetable to guide her schedules to the selected schools. When she got to each schools, she went straight to the head teachers office to obtain permission and to explain the purpose of her visit. She was later led to the classrooms where she informed the pupils and their teachers of the purpose of her visit. Then, the class teachers nominated the struggling readers in their respective



classroom. All the norminee were subjected to multiple sampling (teacher nomination, observation of the progress record chart and Gray's oral reading test) those with the eight worst marks were chosen for the study while the rest were sent back to their classroom. All the eight participants were tested on the same day using the same instrument and scoring scale. This was to ensure that there was no sampling bias.

On such a situation, the researcher's time table was not strictly followed. She got to the school by 7:30 am and worked with individual pupil. Testing for each individual lasted for 20 minutes until all the eight participant in the school were tested. Teaching commenced with the next visit to the school following the researcher's time table. Only those in the experimental group received the intervention while those in the control group when back to class to continue with their normal classes. These interventions were guided by the scheme of work produced by the researcher. Teaching continued throughout the weeks for four weeks in all the school. After four weeks of teaching the first evaluation was given to check if the treatment exercise was having any positive effect on the development of visual discrimination skills for the participants. Individual scores were recorded while teaching continued. Four weeks later the second evaluation test was given and the scores recorded and compared with the previous individual scores to check for improvement. This was followed by revision and the administering of the post-test to the 24 participant following the principles observed during the pre-test. During the last week when the participants were already relaxed with the researcher, interviews were conducted to get more information on the difficulties that struggling readers face with reading and their feeling about their status as struggling readers. The interview in each school lasted for 1hr 20 minutes considering that each participant had about 10 minutes. The class teachers were



also interviewed on their perception about struggling readers and their pedagogic knowledge in handling them. This lasted for about 15 minutes with each teacher having 5 minutes.

In all, the researcher spent 10 weeks in the field visiting each school thrice a week to collect the data. A total of 25 hours 45 minutes were spent in the field as follows; Pre-test: 2 hours 40 minutes (20 minutes each), post-test: 2 hours 40 minutes (20 minutes each), interview for pupils: 1 hour (7 minutes each) interviews for teachers 15 minutes (5 minutes each) and 17 hours 30 minutes for interaction and teaching with the experimental group. The mean scores of the two groups (experimental and control) were compared and inferences drawn, interpretation and discussion made based on the findings

Method of Data Collection

Data was collected qualitatively and quantitatively to minimise bias. After the identification of the participants, the 24 participants were subjected to a pre-test. This was followed by the administration of the treatment exercise only to the experimental group. During this period, those in the experimental group were tested twice to check if the treatment exercise was achieving its objectives. Thereafter, a post-test was administered to the 24 participants to find out if there was any improvement with the experimental group that received the treatment exercise. Later the participants and their teachers were subjected to interviews to get more information about their difficulties with reading and how the teachers handle this situation in school. A total of 25 hours 45 minutes were spent in the field. Data was transcribed descriptively, inferentially and into themes to ease analysis and the drawing of inferences.



The organization of study indicators that led to the various variables under their respective hypothesis is summarized in the table on the operationalization of variables below.

Data Processing and Analysis

Data were entered using Epi Info 6.04d (CDC, 2001), after template was tested by statistician and candidate. Data were then exported to SPSS version 21.0 (IBM Inc., 2012). Descriptive analysis employed frequency, proportion and Multiple-Responses Analysis (MRA) as the variables were categorical.

Progression was computed based on the difference in score between two tests. The various levels of performance were given scores as follow: very mild=4; mild=3; severe=2; very severe =1. A participant with mild status at pre-test and very mild at post test for instance, was considered as having progressed, this was same with a participant with very severe at pre-test and severe at post-test. The differences between the experimental and control groups were carried out using Chi Square Test of Equality of Proportions.

Interviews were analysed using the process of thematic analysis whereby concepts or ideas were grouped under umbrella terms or key words.

Results were summarized in tables, charts, conceptual diagrams and code-grounding-quotation tables. Statistics were discussed at the 95% CL (Alpha=0.05).

Ethical Consideration

The participants were informed about the study and asked to volunteer through nomination. They were assured that any information provided for this study will be confidential and will serve just the purpose for which it is intended. Permission was sought from their parents and the school

administration to get their consent. To ensure their protection, their names were concealed and the pupils given numbers to ease accountability. Only those that were willing took part in the study.

FINDINGS

Four items were tested. They sought to investigate if struggling readers trained to recognise and sort single digit numbers, double digit number, place value and similarities and differences in specified numbers can read better than those who did not receive such training as it is indicated below in all scales.

Pre-test

Table 1: Ability to Work with Numbers at Pre-Test: Experimental Group

Ability to work with Numbers	Very mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	1 (8.3%)	2 (16.7%)	1 (8.3%)	8 (66.7%)	3 (25%)	9 (75.0%)	12
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	0 (0.0%)	1 (8.3%)	1 (8.3%)	10 (83.3%)	1 (8.3%)	11 (91.7%)	12
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	1 (8.3%)	1 (8.3%)	2 (16.7%)	8 (66.7%)	2 (16.7%)	10 (83.3%)	12
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	0 (0.0%)	1 (8.3%)	11 (91.7%)	0 (0.0%)	12 (100.0%)	12

Multiple Response Set (MRS)	2 (4.2%)	4 (8.3%)	5 (10.4%)	37 (77.1%)	6 (12.5%)	42 (87.5%)	48
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The above table reveals that out of the 12 participants in the experimental group tested for their ability to work with numbers at the pre-test, 3(25%) of them had mild difficulties to sort out single digit numbers while 9(75%) of them had severe difficulties to sort out single digit numbers. Regarding the sorting of double-digit numbers 1(8.3%) had mild difficulties while 10(83.3%) had severe difficulties sorting double-digit numbers.

Also, for the identification of differences in specified similar looking numbers, 2(16.7%) of them had mild difficulties while 10(83.3%) had severe difficulties identifying the differences. Then, for the identification of similarities in numbers all the 12(100%) had severe difficulties. Thus, the multiple response set reveals that 6(12.5%) had mild difficulties while 42(87.5%) had severe difficulties working with numbers.

Table 2: Ability to Work with Numbers at Pre-Test: Control Group

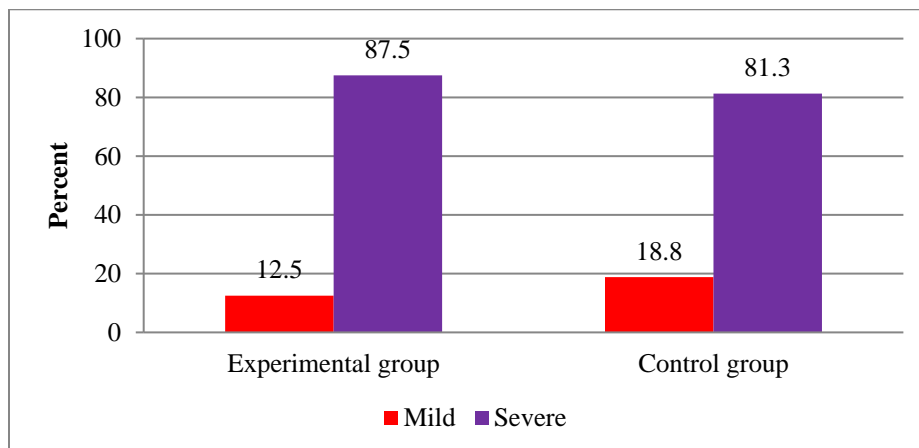
Ability to work with numbers	Very Mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Control Group							
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	3 (25.0%)	1 (8.3%)	1 (8.3%)	7 (58.3%)	4 (33.3%)	8 (66.7%)	
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	0 (0.0%)	2 (16.7%)	3 (25.0%)	7 (58.3%)	2 (16.7%)	10 (83.3%)	
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	2 (16.7%)	0 (0.0%)	2 (16.7%)	8 (66.7%)	2 (16.7%)	10 (83.3%)	
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	1 (8.3%)	1 (8.3%)	10 (83.3%)	1 (8.3%)	11 (91.7%)	

Ability to work with numbers	Very Mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Control Group							
Multiple Response Set (MRS)	5 (10.4%)	4 (8.3%)	7 (14.6%)	32 (66.7%)	9 (18.8%)	39 (81.3%)	

The above table reveals that out of 12 participants in the control group for their ability to work with numbers 4(33.3%) had mild difficulties sorting single digit numbers while 8(66.7%) had severe difficulties sorting single digit numbers.

Also, 2(16.7%) had mild difficulties sorting double digit numbers while 10(83.3) had severe difficulties sorting double digit numbers. Regarding the recognition of differences in similar looking numbers 2(16.7) had mild difficulties recognizing differences in similar looking numbers.

For the recognition of similarities in specified numbers 1(8.3%) had mild difficulties recognizing similarities in numbers while 11(91.7%) had severe difficulties recognizing similarities in numbers. Thus, the multiple response set reveals that 9(88.8%) had mild difficulties working with numbers while 9(81.3%) had severe difficulties working with numbers in the control group.



χ^2 -test: $\chi^2=0.30$; $df=1$; $P=0.584$

Figure 3: Comparing Children Status at Pre-Test between Control and Experimental Group for Ability to Work with Numbers

The initial status of the children indicates that in both the experimental and the control group, the majority had severe disabilities with proportion of 87.5% (MRS: $n_{responses}=42$) and 81.3% (MRS: $n_{responses}=39$) for the experimental and control group respectively and the difference here was not significant (χ^2 -test: $P>0.05$), which is good for the validity

Formative Evaluation

Table 4: Ability to work with numbers at formative evaluation: experimental group

Ability to work with Numbers	Very Mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	3 (25.0%)	7 (58.3%)	2 (16.7%)	0 (0.0%)	10 (83.3%)	2 (16.7%)	12
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	2 (16.7%)	8 (66.7%)	2 (16.7%)	0 (0.0%)	10 (83.3%)	2 (16.7%)	12
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	7 (58.3%)	5 (41.7%)	0 (0.0%)	7 (58.3%)	5 (41.7%)	12
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	5 (41.7%)	6 (50.0%)	1 (8.3%)	5 (41.7%)	7 (58.3%)	12
Multiple Response Set (MRS)	5 (10.4%)	27 (56.3%)	15 (31.3%)	1 (2.1%)	32 (66.7%)	16 (33.3%)	48

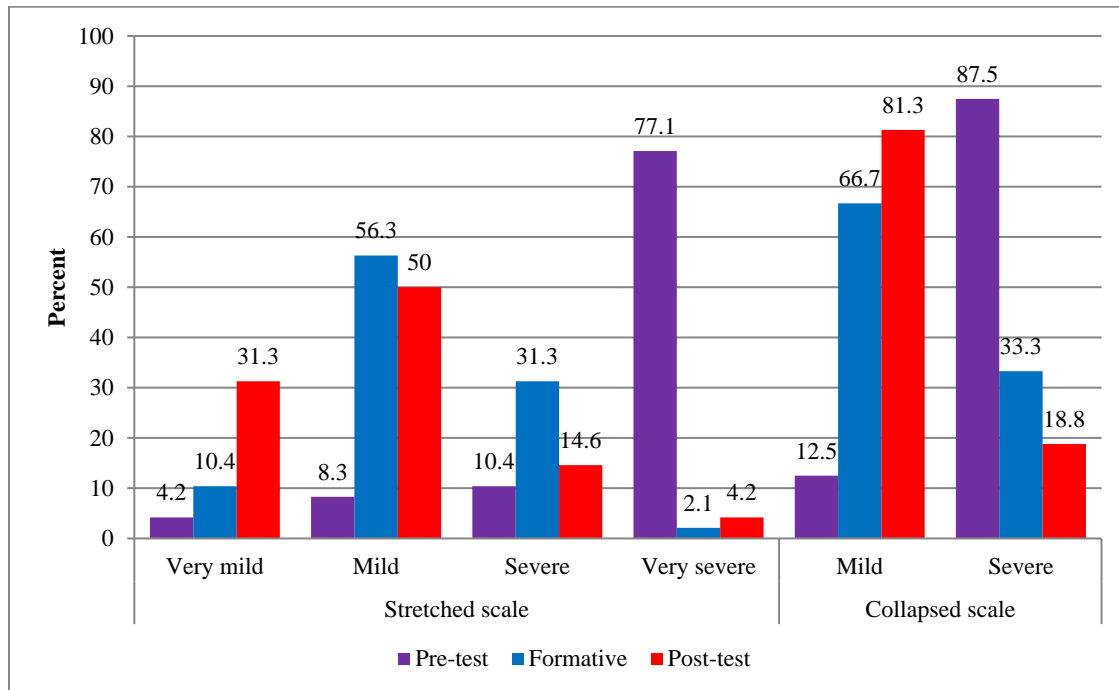
The table above reveals that out of the 12 participants working with numbers at the formative test in the experimental group 10(83.3%) had mild difficulties with the sorting of single digit numbers while 2(16.7%) still had severe difficulties with the sorting of single digit numbers.

Also, for the sorting of double-digit numbers 10(83.3%) had mild difficulties with the sorting of single digit numbers, while 2 (16.7%) still had severe difficulties with the sorting of double digit numbers. Regarding the recognition of difference in specified numbers, 7(41.7%) still had severe difficulties recognizing differences in numbers. For the recognition of similarities in numbers, 5(41.7%) still had mild difficulties with similarities in numbers while 7(58.3%) still had severe difficulties with the similarities in numbers.

Post-test

Table 5: Ability to Work with Numbers at Post-Test: Experimental Group

Ability to work with Numbers	Very mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Experimental Group							
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	8 (66.7%)	4 (33.3%)	0 (0.0%)	0 (0.0%)	12 (100.0%)	0 (0.0%)	12
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	4 (33.3%)	8 (66.7%)	0 (0.0%)	0 (0.0%)	12 (100.0%)	0 (0.0%)	12
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	2 (25.0%)	6 (50.0%)	2 (16.7%)	1 (8.3%)	9 (75.0%)	3 (25.0%)	12
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	6 (50.0%)	5 (41.7%)	1 (8.3%)	6 (50.0%)	6 (50.0%)	12
Multiple Response Set (MRS)	15 (31.3%)	24 (50.0%)	7 (14.6%)	2 (4.2%)	39 (81.3%)	9 (18.8%)	48



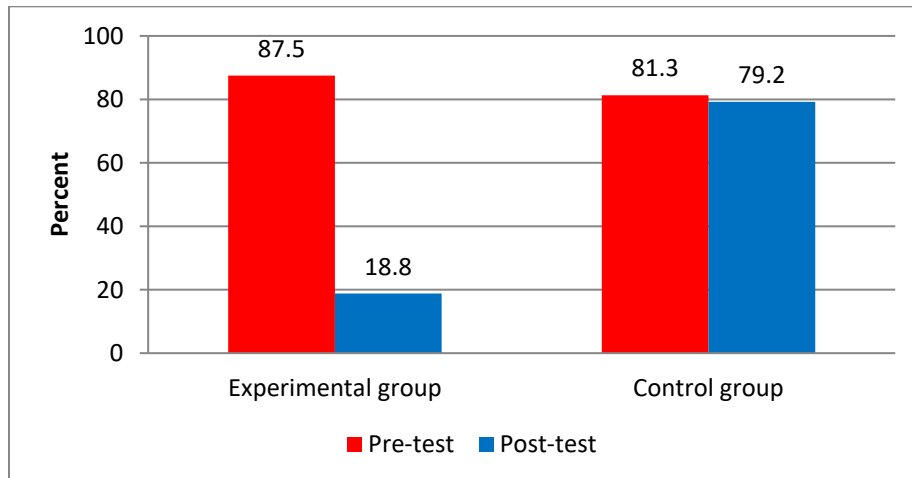
χ^2 -test: $\chi^2=10.67$; $df=1$; $P=0.001$.

Figure 7:Change in Disability Status in the Experimental Group for Ability to Work with Numbers

There was a significant improvement in the condition of the children in the experimental group. The proportion of children with severe visual discrimination disability decreased from 87.5% (MRS: $n_{responses}=39$) at pre-test to 33.3% (MRS: $n_{responses}=16$) at the formative evaluation to 18.8% (MRS: $n_{responses}=9$) at post-test and this change was very significant (χ^2 -test: $P=0.001$).

Table 8: Ability to Work with Numbers at Post-Test: Control Group

Ability to work with Numbers	Very Mild	Mild	Severe	Very Severe	Collapse		N
					Mild	Severe	
Control Group							
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	2 (16.7%)	3 (25.0%)	0 (0.0%)	7 (58.3%)	5 (41.7%)	7 (58.3%)	12
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	2 (16.7%)	1 (8.3%)	0 (0.0%)	9 (75.0%)	3 (25.0%)	9 (75.0%)	12
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	0 (0.0%)	1 (8.3%)	2 (16.7%)	9 (75.0%)	1 (8.3%)	11 (91.7%)	12
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	1 (8.3%)	0 (0.0%)	2 (16.7%)	9 (75.0%)	1 (8.3%)	11 (91.7%)	12
Multiple Response Set (MRS)	4 (8.3%)	6 (12.5%)	4 (8.3%)	34 (70.8%)	10 (20.8%)	38 (79.2%)	48



Experimental group: χ^2 -test: $\chi^2=10.67$; $df=1$; $P=0.001$; Control group: χ^2 -test: $\chi^2=0.30$; $df=1$; $P=0.584$

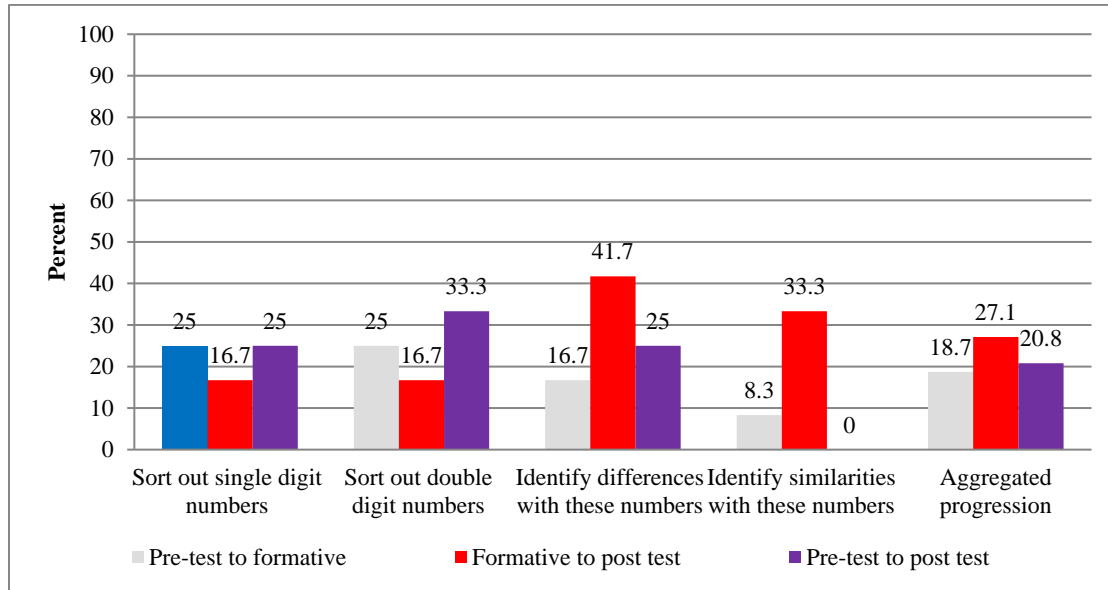
Figure 9: Comparing Change in Disability Severity between Pre-Test and Post-Test and within Test Group for Ability to Work with Numbers

In the experimental group, from pre-test to post test, it was realized that there was a very significant drop from 87.5% to 18.8% (χ^2 -test: $P < 0.001$) in the proportion of children with severe disability. Unlike the experimental group, there was obviously no change in the control group though a slight decrease from 81.3% to 79.2% was observed but this was probabilistically due to chance (χ^2 -test: $P > 0.05$).

Table 10: Comparing Progression between Pre-Test and Post-Test for Ability to Work with Number

Ability to Work with Number	Cumulative Progression (in percentage of those with positive change in score)				χ^2 -test
	Experimental Group (N=12)			Control Group (N=12)	
	Pre-test to Formative	Formative to Post test	Pre-test to Post test	Pre-test to Post Test	
Sort out single digit numbers (21, 2, 14, 5, 3, 9, 0, 6, 7, 19, 11, 1, 4 and 8)	3 (25.0%)	2 (16.7%)	3 (25.0%)	1 (8.3%)	$\chi^2=8.341$ $P=0.015$
Sort out double digit numbers (21, 12, 43, 34, 91, 19, from (121, 21, 43, 34, 51, 81, 84, 91, 19 and 12)	3 (25.0%)	2 (16.7%)	4 (33.3%)	0 (0.0%)	$\chi^2=14.40$ 0 $P=0.001$
Identify differences with these numbers (51, 15, 121, 112, 43 and 34)	2 (16.7%)	5 (41.7%)	3 (25.0%)	1 (8.3%)	$\chi^2=8.232$ $P=0.016$
Identify similarities with these numbers (51, 15, 121, 112, 43 and 34)	1 (8.3%)	4 (33.3%)	0 (0.0%)	0 (0.0%)	-
Aggregated	9	13	10	2	$\chi^2=6.10$

progression	(18.7%)	(27.1%)	(20.8%)	(4.2%)	P=0.013
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χ^2 -test: $\chi^2=0.35$; $P=0.837$

Figure 10:Change in Progression in the Experimental Group for Ability to Work with Numbers

In aggregate, progression was weak. Though there was a slight increase, progression was relatively constant at (χ^2 -test: $\chi^2=0.35$; $P=0.837$) across test levels as it was 18.7% from pre-test to first formative, dropped slightly to 27.1% between first formative and post-test and was 20.8% from pre-test to post-test.

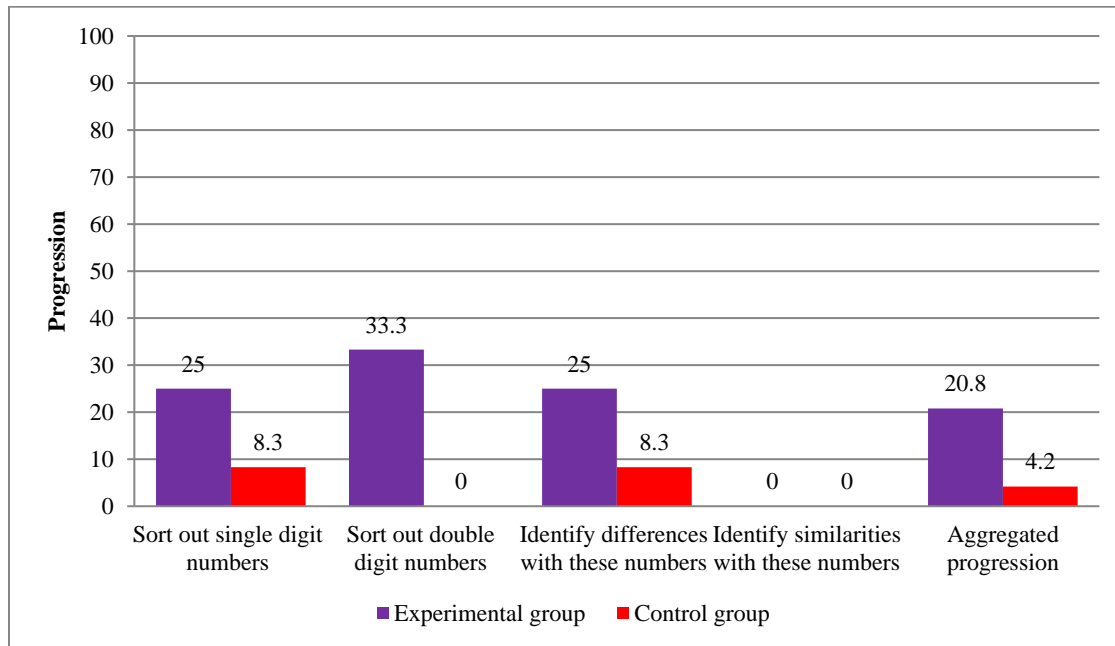


Figure 11: Comparing Progression between Experimental and Control group for Ability to Work with Numbers

Comparing progression between control and experimental groups, for all the scales, progression was higher in the experimental group and in aggregate, it was 20.8% in the experimental group as against 4.2% in the control group and this discrepancy was significant (χ^2 -test: $P < 0.05$).

This research hypothesis dwelled on confirming or rejecting if visual discrimination training on the recognition of numbers has an effect on reading among struggling readers in primary five in the Buea municipality. Four items were examined in all scales (Pre-test, teacher made test and post-test) on pupils' ability to identify single digit numbers, place value of numbers, and the ability to recognise similarities and differences in double digit numbers. Comparing the progression between the experimental and control groups in all scales, it was revealed that, there



was a higher progression with the experimental group that received the treatment in all scales at 20.8% as against 4.2% in the control group. This implies that we reject the null hypothesis and retain the alternative. This implies that visual discrimination training in the recognition of numbers has an effect on reading among struggling readers in primary five in the Buea Municipality.

In addition, participants were interviewed on their opinion about their ability to recognize single digit numbers amongst other numbers. The findings revealed that out of the 24 participants 9 said they were numbers they know while other 9 said they are numbers that are written together and 6 said they were numbers that carry a single digit. This implies that 18 of them did not know what single digits were.

Regarding their ability to identify the place value of 3 in 132, 7 said it was hundred while 10 said it was tens and 7 of them said it was unit. This therefore implies that cumulatively 17 of them did not know place value of numbers.

Besides when interviewed on their ability to recognise similarities and differences in numbers 51 and 15, out of the 24 participants 5 said the numbers have the same value while 9 said they numbers have the same digits and 10 said the they do not know. This implied that 14 of them did not recognise the similarities between the two numbers.

In addition, when interviewed on their ability to recognise the differences between 25 and 52 out of the 24 participants 8 of them said the numbers are the same while 7 said the numbers have different place value and 10 said they do not know. Cumulatively 18 of the pupils did not



recognise the place value of the middle numbers. This implies that some primary five pupils in Buea municipality have visual discrimination deficit with numbers. Rene (2013) supports this that children with visual discrimination deficit with numbers have problems with double digit, triple digit or more digit numbers. They stress that such pupils need visual discrimination training to help them read as the experimental group reveals it.

This implies that visual discrimination training on the recognition of numbers has a positive effect on reading among struggling readers in primary five in Buea municipality in Cameroon. This view is reiterated by Rongione (2000) that struggling readers get confused between similarly looking numbers like 6 and 9, 2 and 7 and also between 12 and 20 because they are all written with "tw" at the beginning. Besides she stresses that struggling readers have difficulties with the four operational rules in mathematics. For example, instead of readily knowing that $5+7=12$ they continue to count their fingers, pencil stroke or scribble papers to get the answer. To buttress this point Brain (2013) stresses that children with visual discrimination deficit experience difficulties with recognizing numbers, symbols and the four mathematical rules. However children with visual discrimination deficit for numbers are capable of learning how to read numbers as revealed by the experimental group and therefore require visual discrimination training for the recognition of numbers.

Implications of the research to education

This study has brought to the lamplight some important contextual information about how theories guide practice in the field of education in order to cope with issues of diversity in learners for the development of a healthy personality.



The study therefore adds more knowledge to the magnocellular deficit theory of dyslexia by stressing that it is necessary to assess struggling readers before providing them with the appropriate repeated instruction. This implies that if teachers can identify that a particular learner has visual discrimination deficit through assessment this will help them provide the child with the appropriate instruction that will meet the specific needs of the learner.

Also, it highlights the need for attitude change on the part of teachers and parents to encourage children learn irrespective of their status learn irrespective of the status.

Besides, it touches on the pedagogic competences of Basic education teachers to imbibe new strategies of enriching classroom environment to meet the needs of all learners in their classrooms.

Also, it addresses teachers of Basic education and parents of struggling readers by providing information about the reading process, characteristics of struggling readers their needs and desires and how they could be handled to enable them read and develop a healthy personality.

More so, it raises the issue of inadequate training and professional development for teachers at both initial and in -service levels with respect to the production of instructional materials using salvage materials. There is enough evidence from the data collected to illustrate that struggling reader's are not given the necessary support they deserve in our primary schools. If the recommendations of this study are implemented some benefits will be realised that will lead to Psychological satisfaction for the learners, their families, the educational system and the larger community.



Furthermore, this study highlights the need for improvement on the training programme for teacher trainers include more of a practical approach in teaching in order to be more reformat. It calls on policy makers to introduce courses on how to prepare instructional materials at the level of Higher Teachers' Training Colleges to give graduates more skills. This will empower them with skills that they will eventually transfer to their trainee. Such practices will help Teacher Training Institutions to function as workshop centres for the production of instructional materials that will suit the different groups of learners. In this way, student teachers will also acquire skill to take to the field to be able to teach effectively. This will go a long way to improve pedagogic practices and the achievement of teaching and learning goals in primary schools.

More so, it reminds teachers and parents on how children acquire skills in reading so that they can better prepare their children for schooling. This will help them provide their children with enriching literacy environment to nurture reading

Furthermore, it tickles the minds of administrators and policy makers to reflect on the need to provide struggling readers with early intervention programs that will help nurture in the learners a reading culture.

Parent and teachers will know from this study that when struggling readers are excluded and ridiculed in the learning to read process it limits their potentials by causing them to consider themselves as failures. Issues raised in this study will guide policy makers and administrators to make sound judgment and take decisions that will suit our culture and environment. Therefore, it is necessary to encourage and motivate struggling readers in our primary schools. In this way,



more children will be able to develop their full potentials and become experts in their different areas based on their talent and aptitude.

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