

IMPACTS OF LOW VISION AIDS ON THE READING COMPREHENSION OF LEARNERS WITH LOW VISION IN KADUNA, NIGERIA: AN EXPLORATORY STUDY

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Abstract

In most special schools for the blind, children read by means of Braille irrespective of the status of their residual vision. The purpose of this study was to determine the effects of low vision aids on the reading comprehension of children with low vision. A quasi-experimental design was adopted for the research. Twelve children with low vision (9 congenitally and 3 adventitiously blind aged 11 – 15) were purposively assigned equally to experimental and control groups. Reading Comprehension Test (RCT) was used as pre-test / post-test (r.95) while the Low Vision Aids Programme (LVAP) was used as intervention with the experimental group. Four research questions and two hypotheses guided the study. The treatment lasted for six weeks. Descriptive statistics and t-tests were used to answer and test the research questions and hypotheses respectively. The results showed that the pre-test maximum number of letters read was 7 while post – test results showed that (a) the experimental group identified the 26 letters of alphabet (b) pronounced the sound of the letters correctly (c) blended the letters to form words and read short sentences (d) eight out of the twelve children said they would read by Braille and print while four (in the control group) preferred to read only by Braille mode. Age of onset of visual loss did not affect the reading level of the children. It was recommended that schools for the blind should screen and identify low vision children, introduce low vision aids and expose them to print reading so they have a choice to read by Braille or by print or by both.

Introduction

The emphasis of goal four of the sustainable development goals (SDGs or global goals) is on inclusive and quality education including lifelong learning for ALL (emphasis ours). UNESCO (2010) avers that “obtaining a quality education is the foundation to improving people’s lives and sustainable development”. Children with low vision’s (CLV) capacity for quality

education and improvement in their lives must begin with competence in literacy skills in a widely used medium (print) rather than in the limited media (tactile and auditory). These skills include “awareness of sound of language, print and relationship between letters and sounds, vocabulary, spelling and comprehension (www.blueridgeliteracy.org).

Children with low vision are mostly educated in special schools for the blind despite the fact that inclusive education is the globally prevailing system of education for them. In these schools every child is forced to learn to read and write Braille irrespective of their visual status. Research has shown that between 80% - 90% of children with visual impairments have residual vision sufficient enough to enable them function in a sighted way if properly managed (Baraga, 1964; Wikision and Transtham, 2004; Ozoji, Unachukwu and Kolo, 2016). One management tool for such vision is the low vision aids (LVAs), which grow the visual acuity of the children.

There is a wide variability of vision among children with visual impairment ranging from minor ocular distortions to no light perception (Sykes and Ozoji, 1992). Low vision is a level of vision that hinders the planning and or execution of a task, even with corrections, but which permits enhancement of the functional vision through optical and non-optical devices. (Individuals with Disabilities Act, 2004). In medical terms, children with low vision have decreased vision of 20/70 visual acuity or less or decreased field of vision (peripheral vision) or both. These children usually retain some useful vision and should not be treated as blind people.

The problems in the education of CLV include the ignorance about the use of LVAs, non visual assessment of the children on admission into a school, limited awareness that print reading is possible and profitable for CLV, non-availability of LVAs in most schools or their non-usage were available. Chapman (1978:85) added “lack of encouragement or positive discouragement to use their sight”. It follows that, LVA services are practically non-existent in special schools for the blind nor provided in inclusive settings. The implication of these challenges is that CLV are overlooked and are disadvantaged in the learning process.

Tools for reading print by CLV are in four categories: large prints (normal print size is 10 -12 point), non-optical devices (eg book stand), electronic devices (eg computer with screen magnification software) and optical devices which typical types are spectacles, eye glasses and magnifiers. Basic print includes word recognition (constructing understanding from words) and fluency (making meaning out of words and sentences). These aids should constitute a sizable portion of assistive technology resource in every school or programme with children with visual impairment. The principal

objective of assistive technology in this context is to enhance print reading and independent functioning for learners with visual impairment

The statistics of CLV in this country is inconclusive. Currently, there are no special needs diagnostic procedures in place (Biermann, 2016). The 2006 Nigerian Census reported 3.3m people with disabilities or 2.3% of the total population of 140 million Nigerians. The national baseline survey of persons with disabilities conducted in 2009 – 2010 reported a prevalence of 3.2% of these people which is about 4.8m. Some other estimates quote higher prevalence rates.

Thus, it is difficult to know the actual number of CLV who at the moment read only braille but who have potential to read print like their peers in developed countries in this country. Without being identified as CLV, it is doubtful if the children can ever obtain quality education emphasized in goal four of the global goals.

There are paucity of studies on LVA in print reading of CLV. Studies in LVA (see Rabi, 2012; Barbie, 2001; Akang, 2010) concentrated on prevalence of CLV. To the best of knowledge of the researchers, none so far has investigated the use of LVA in the development of print reading. The need for extensive research in this area is therefore, critical. For instance, Gunpel, Vanbol, Schreuder and Andriaasen (2002) noted that CLV with or without additional disabilities are poor readers and spellers than their sighted peers. Other research findings show that CLV can achieve reading rates close to their age mates with normal vision when appropriate magnification was provided, they had overall improvement in reading accuracy from baseline upwards; vision care intervention do increase accuracy from frustration level to independent level etc (Zutelli, Rasinski 2009).

The disturbing fact that CLV were only exposed to Braille reading, while their peers in developed countries read print with the aid of LVAs, compounded by the fact that teachers lack the competence to teach print reading with the use of LVAs, and the non availability of LVA services in special schools to teach print reading prompted this exploratory study on the impact of LVA on the print reading comprehension of CLV. The problem of the study could be summarized in (a) establishing the children's baseline in letter identification, print reading comprehension, age of on-set of visual impairment and impact of LVA on print reading and comprehension as well as the preferred reading style between print and Braille after the study. These issues led to formulating the following research questions and hypotheses:→What is the base line level of letter identification in print by learners with low vision?

- What is the age of onset of vision disorder among the learners with low vision?
- What is the nature of achievement by learners with low vision in reading comprehension?
- What is the preferred reading style of children with low vision?
- There is no significant difference between the comprehension mean score of learners taught with low vision aids and those not taught with the aids
- The comprehension mean score of learners taught with low vision aids will not differ on account of age of onset of vision disorder.

Method

A quasi-experimental, non-randomized pre-test post-test control group design was employed in the study, “because randomization of the learners was not possible”.

(Awontunde & Ugodulunwa, 2004).

The population comprised 100 learners with visual impairment in the Kaduna State Special Education School in Kaduna North Local Government Area of the State. The sample of 12(5 boys and 7 girls, age ranging between 11 and 15) was purposively drawn out of the 18 learners with visual impairment who underwent diagnostic tests to determine their visual status and acuity. The number was limited to a workable class size and the number of magnifiers available for the study. The learners were equally grouped into experimental and control groups.

Two instruments were developed and used for the study –Test on Reading Comprehension (TRC) and an interview schedule. TRC comprised two sections: Section A measured ability to identify upper and lower case letters, while Section B measured the learner’s ability to recognize and blend sounds of letters together to form words. The New Queen Primer Part I textbook was used to develop the instrument. The oral interview schedule sought two information from the learners – age of on-set of their visual impairment and their preferred reading style (after the experimental intervention).

The TRC was checked for content validity by an expert in English language from the University of Jos. The observations pointed out were useful in crafting the final version of the instrument. The reliability of the instrument was determined through a two weeks interval test – retest at the School for Blind Children, Gindiri in Plateau State. The two results were correlated with Cronbach Alpha which yielded an $r = 0.958$.

Two research assistants and two consultants were trained/engaged. The two assistants were special teachers of learners with visual impairment at the school with competency in teaching English language. The other two were a consultant ophthalmologist and an optometrist. The consultants with the help of the ophthalmic nurse carried out eye examination and visual acuity tests to determine the learners with low vision ones among the children with visual impairment in the school

The researchers obtained written permission from the Commissioner of Education and thereafter, got acquainted with the head-teacher, staff and learners in the school. The pre-tests were administered in the first week to both the experimental and control groups who initially found the exercise very difficult because Braille had been their only mode of reading and writing. The treatment consisted of the use of low vision aids (magnifiers) in three stages. Stage one was the mastery of the use of the magnifiers, the use of the devices to master and identify the upper and lower letter cases including their sounds (60 minutes a week) and lastly the blending of the sounds for the alphabets to form words and reading short sentences for another 120 minutes a week. In all, the treatment lasted for 180 minutes (3 hours) per week for a total period of six weeks. The Control group was exposed to the same learning tasks but without the magnifiers. At the end of the six weeks the pre-tests were repeated as post-tests on both the experimental and control groups. The four research questions were analyzed by use of descriptive statistics: percentage and mean while the independent t test was employed in testing the two hypotheses.

Results

Table 1: Base Line letter identification

	Frequency	Percentage	Valid Percentage	Cumulative percentage
Poor	8	66.7	66.7	66.7
Fair	4	33.3	33.3	33.3
Good	0	0	0	0
V. good	0	0	0	0
Total	12	100	100	100

Poor = 0 – 5 letters; Fair =7 – 12 letters; Good =13 – 20 letters; Very good = 21–26 letters

Figure1: Showed the pie chart of the base line level in percentages. 8 learners (66.7%) could not read (identification of letters in print) while 4 (33.3%) were fair, having attempted to identify between 7 and 10 letters as a result of previous experience.

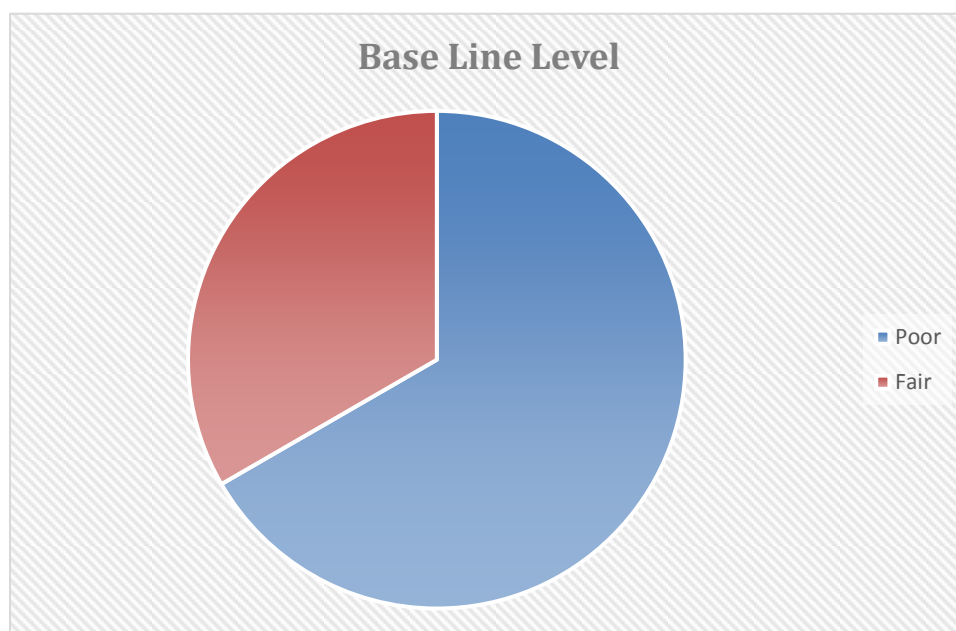


Table 2: Age of onset of Visual Impairment

Onset	Frequency	Percentage	Valid percentage	Cumulative percentage
Congenital	9	75	75	75
Adventitious	3	25	25	25
Total	12	100	100	100

Table: 2/ Fig 2. showed data/ histogram of the age at onset of vision disorders in the children with low vision: 75% congenital, 25% adventitious.

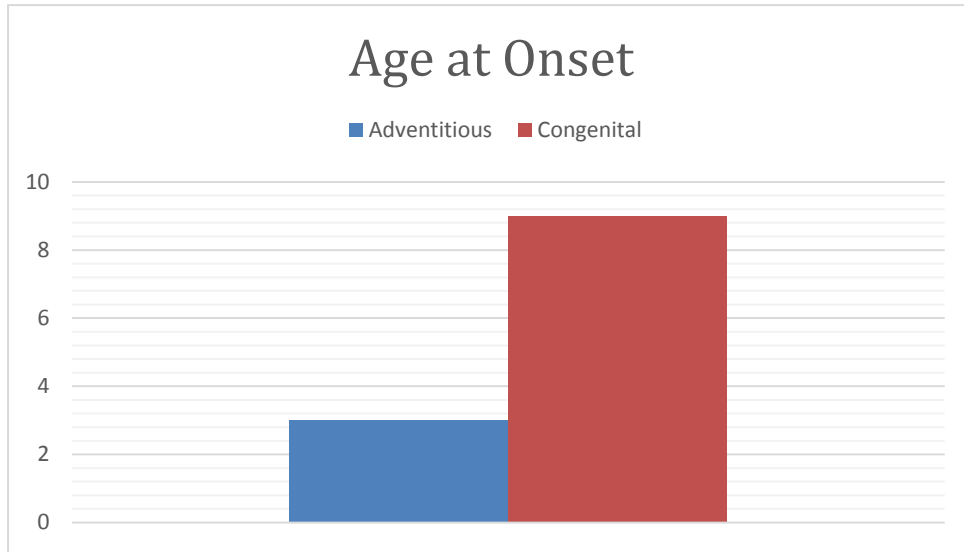


Table 3: Achievement mean scores of the learners

Achievement Score	Group	N	X
	Experimental		6
Control		6	10.9

Figure 3a

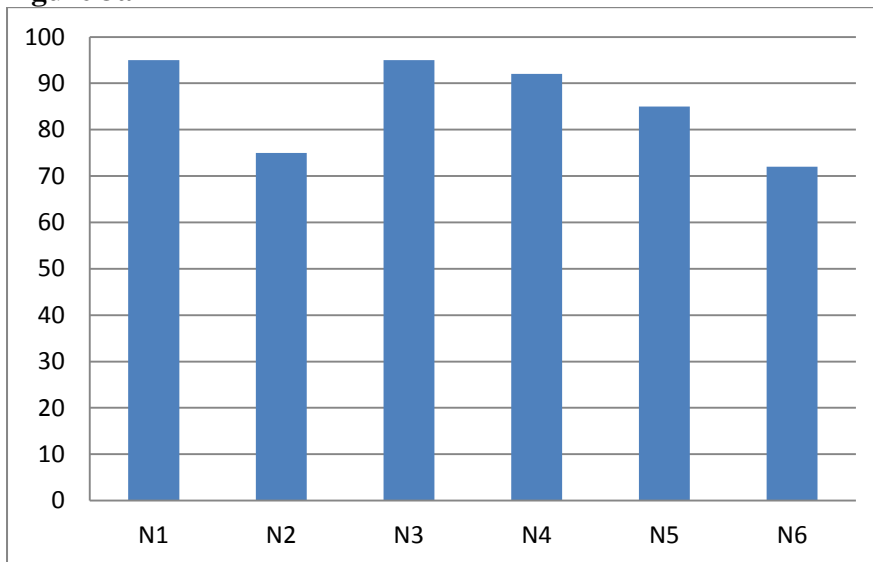


Figure 3b: Learners in the Experimental Group

- (a) Individual achievement on reading comprehension for experimental group.
- (b). Individual achievement on reading comprehension for control group.

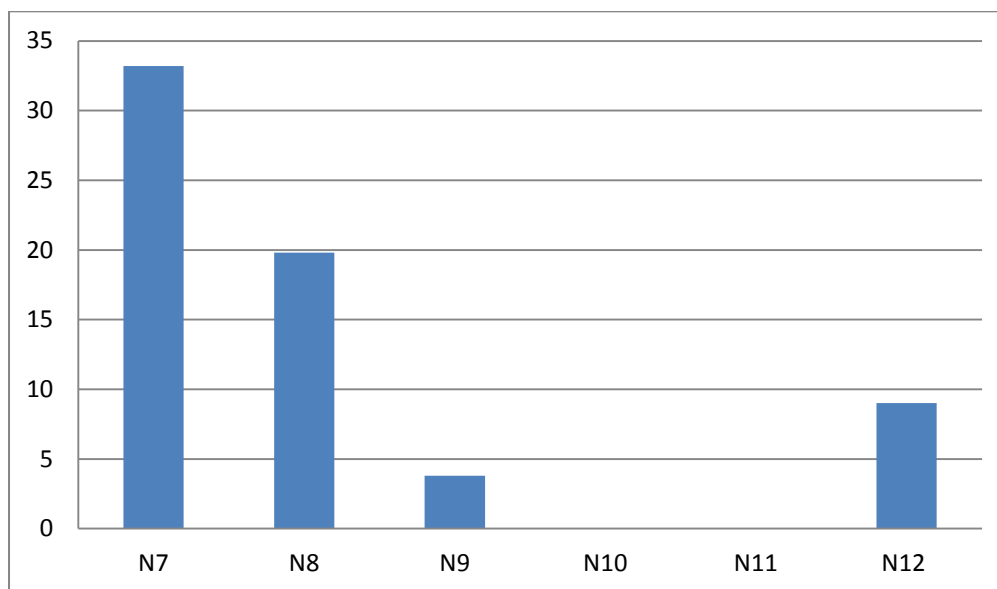
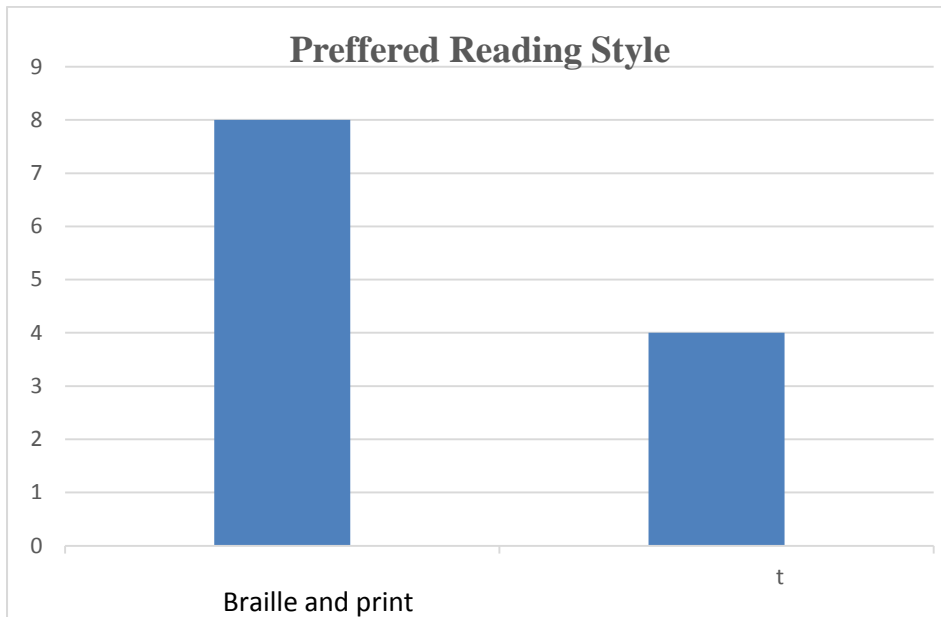


Table 3, Figures 3a and 3b depict the achievement scores of the two groups. There is significant difference in the mean score in reading comprehension of the experimental and control groups.

Table 4: Preferred Reading Style

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Braille and print	8	66.7	66.7	66.7
Braille	4	33.3	33.3	33.3
Total	12	100	100	100



Preferred reading style

Figure 4: Showed a bar chart of the preferred reading style of the children with low vision. 4 learners representing 33.3% preferred reading Braille while 8 learners representing 66.7% preferred Braille and print reading.

Table 5: Experimental and control group means on comprehension test

	Groups	N	Mean	Standard Deviation	Standard Error
Post test	Experimental Group	6	88.000	11.3052	4.6153
	Control Group	6	10.633	13.2613	5.4139

Table 6: Independent Samples Test

Levene's Test For Equality of Variances									
	F	Sig	t	dff	Sig (2-tailed)	Mean diff	Std error diff	95% Confidence interval of diff	
								Lower	Up
Equal Variance Assumed	181	.680	10.875	10	.000	77.3667	7.1142	61.5753	
Equal Variance Not Assumed			10.875	9.756	.000	77.3667	7.1142	61.4613	

Since the p – value from the table is less than the level of significance (0.05), we reject H_0 , and therefore conclude there is a significant difference between the comprehension mean score of learners taught with low vision aids and those not taught with the aids.

Table 7: Age of onset and comprehension test

	Age of onset	N	Mean	Standard Deviation	Standard Error Mean
Post test	Congenital	4	87.1500	11.92127	5.96063
	Adventitious	2	89.700	14.28356	10,10000

Table 8: Independent Samples Test

Levene's Test For Equality of Variances									
		F	Sig	t	Df	Sig (2-tailed)	Mean Difference	Std error difference	95% Confidence interval of diff Lower
Post test	Equal Variance Assumed	0.088	0.781	-235	4	0.826	-2.55000	10.87172	-32.734747
	Equal Variance Not Assumed			-217	1.747	0.851	-2.55000	11.72771	-60.69362

Since the P-value (0.826) is greater than the level of significance, we fail to reject H_0 . Therefore, there is no significant difference in the comprehension mean score of learners taught with low vision aids on account of age of onset of low vision.

Discussion

From the achievement profile in Table 1, it could be seen that the experimental group achieved better than the control group in identification and saying of the sounds of the alphabets, blending these sounds to form words and progressing to reading short sentences. The experimental group also achieved better than the control group in identification and application of punctuation marks in reading sentences.

The result of the research showed that the use of the magnifiers encouraged good participation of learners with low vision in the teaching and learning of reading comprehension. This is an aspect of learning that learners

with low vision in Nigeria are not exposed to as compared to their counterparts in the developed countries as observed by Taha, Muhammad, Boshre, Neveen & Hanaan (2009) who stated that vision rehabilitation with use of optical vision aids was found to be very helpful in minimising the impact of low vision and improving daily performance of persons with low vision.

Therefore, the use of low vision aids (magnifiers) enhances a better achievement in reading comprehension of learners with low vision. The magnifiers could be used in teaching, reading in English language and any other subject in general to enable learners with low vision participate and achieve better in reading prints to avoid a total dependence on Braille reading in Nigeria. With competence in print reading learners with low vision in Nigeria will be able to compete with their LWLV counterparts in the developed countries who start reading print from kindergarten.

It was also observed that learning of alphabets in prints and their sounds enhanced reading, which learners with low vision in Nigeria are not exposed to, unlike in developed countries. This agrees with Texas Education Agency (2002) which opined that children's knowledge of letter names, shapes and sound are strong predictors of their success in learning to identify letter and reading. And also that letters, letter patterns present the sounds of spoken language, this relationship improves reading.

The baseline level knowledge on identification of alphabets in print by learners with low vision, shows that they were never formally instructed in reading print in the schools for persons with visual impairment in Nigeria, This is not altogether in keeping with the observation of Rao (2016) who stated that learners with low vision read prints and gain information from pictures, charts and graphs when the material is up close.

The study proved that the age of onset of low vision is not a determining factor in achievement in reading comprehension of learners with low vision. The result of the study revealed that there is no significant comprehension mean difference in the achievement test in reading of the learners with low vision on account of age of onset. Therefore, the study shows that the use of low vision aids (magnifiers) did not affect achievement in reading comprehension based on age of onset of low vision.

Different researchers have opinions differing from one another about achievement of persons with visual impairment. Jurmang (2016) confirms that the age of onset of visual impairment does not influence achievement by learners with visual impairment while Fletcher (1980) cited in Jurmang (2016), identified theories that had existed for long indicating lower

performance of persons with congenital visual impairment over those that are adventitiously visually impaired.

The study revealed that at the end of the experimental intervention, the 12 LWLV in both experimental and control groups were interviewed as to what style of reading each of them preferred; 8 preferred both Braille and Print reading due to the awareness created by the research on the use of low vision aids. This goes to highlight the need for early exposure of LWLV to the use of low vision aids as supported by Hassan and Imran (2004).

While 4 of the LWLV preferred only Braille reading due to the fact that they were already used to Braille reading and not print, 2 out of these 4 LWLV specifically complained that no one will buy the magnifiers for them and that it was also stressful learning how to use the magnifiers.

This further reveals that the lack of utilization of the residual vision in LWLV early in life also contribute to their inability to adopt easily to the use of the low vision aids as seen in the finding of National Federation of the Blind (2016) which emphasized that visual utilization when possible should be allowed for learners with low vision as opposed to the more historically common practice of teaching Braille to all students regardless of individual need of visual acuity.

Conclusion

- The study results, analysis and discussion lead to the following conclusion:

There were no low vision optical aids (hand-held, stand-held magnifiers) in a school for children with varying degrees of visual loss. Incidentally, when these were donated to the school, the school authority did not know what to do with them nor how to use them to teach print reading to children with low vision in the school.

>The exposure of the experimental group to the low vision aids in print reading and comprehension, significantly increased their achievement in reading when compared with their peers in the control group. The non-usage or application of these aids in teaching children with low vision is a major drag in the effort of the children to equalize reading opportunities of their peers without visual problems.

>Contrary to the literature and common sense expectation that age of onset of visual loss will mark a significant impact on the achievement level of the children when it comes to learning, the study data did not support the prevailing cliché about age of on-set of visual loss advantaging some and disadvantaging others in the learning process.

Prior to the experimental intervention of the use of low vision aids, print identification and reading comprehension were significantly poor among the children.

Recommendations

Based on the findings of this study, the following recommendations become inevitable.

- The Ministry of Education through the SUBEB should create awareness of low vision aids, their uses in teaching print reading so that children with low vision can have the option to read either by print or braille or both as the reading situation demands or arises. In addition, low vision optical devices are designed to improve visual performance in children with low vision, their academic and social adaptation, thus making the devices available, and teaching with them become imperative.
- Training institutions (Universities and Colleges of Education with Department of Special Education) should emphasize the skills in the use of low vision aids in their curriculum contents so that teachers are adequately trained on their use upon graduation.
- The procurement of equipment for special schools should generously allocate funds for the purchase of low vision optical devices including stand and hand-held magnifiers, strong reading glasses, loupes, clip-ons and small or focusable or autofocus telescopes.
- >Schools for the blind should organize hands-on workshops for teachers on the utilization of low vision aids in teaching print reading to children with low vision in the schools.

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