

# Colored Overlays: An Intervention Tool in Reading for the Grade Two Learners

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## ABSTRACT

Reading is an essential element for a child's learning and success. At the same time, reading can be very challenging, especially when the materials are unfamiliar, technical, and complex. An intervention tool is being used to alleviate reading difficulties particularly the reading rate of the learners. This material is called Color Overlays, a type of tinted filter and is a plastic reading sheet tinted with color and placed over text to eliminate a wide range of reading difficulties such as low reading rate, accuracy, and comprehension. This research investigated the effects of Irlen's Colored Overlays on reading rate as an intervention tool for the Grade Two Instructional Level of learners, with a class teacher initiating the study and a teacher-librarian conducting the assessment. All of the 52 learners were screened with a vision test. They were grouped into two wherein only the experimental group used the color overlays as their intervention. The result of the study implies that with or without the intervention, the reading rate of the learners is expected to increase. Therefore, Iren color overlays have no statistical significance and immediate effects on the reading rate of the learners.

**Keywords** — Education, color overlays, reading rate, reading, instructional level, Philippines

## INTRODUCTION

Reading is an ability that unlocks the door of learning and success. It is commonly accepted that reading is a foundation skill that plays a major role in a child's academic success. The history of teaching reading includes many theories about the development of reading. The sources of reading difficulties stem from a phonological basis and interventions that target this area are generally beneficial in helping improving reading skills (National Reading Panel, 2000; Lyon, Shaywitz, & Shaywitz, 2003; Stanovich, 1986).

Children who experienced positive early interactions with reading tend to develop into good readers who enjoy engaging in the task of reading. These children can read with relative ease and comfort; they will read more and continue to build their reading skill and knowledge base (Irlen, 2005; Stanovich, 1986; Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008). However, for many children, reading does not develop that easily. Instead, reading is a strenuous task and one that requires a significant amount of energy and effort to obtain meaning. When students struggle in reading, other aspects such as their spelling, writing skills, general knowledge, and vocabulary development are also affected. With that, the teachers are in a difficult position. Teachers are also held accountable to implement measures that will make low performing students perform on grade level or better than it.

Moreover, children may struggle with reading for a variety of reasons, including limited experience with books, speech and hearing problems, and poor phonemic awareness. Some struggling readers have weakness in the neural feedback loops controlling the eye muscles that control this movement. That makes focusing accurately on a word in a sentence very hard.

As what Wyman (2003) mentioned, there was always an important reason when children do not like or want to read. Often, they do not have the visual skills in place to see the printed page correctly, but it has not been diagnosed. When it is diagnosed, most often the child does not see the printed page the way he should and that learning-related visual skills are missing, such as the ability to track from left to right, and therefore the child skips lines. By then, the child does not like reading in which comprehension suffers.

According to Meares (1980), the factors that contribute most to struggle with reading in children originate in the perceptual instability of the visual input due to the organization of the figure with respect to the background of the black ink writing on a white paper, which is typical in printed books. The idea, therefore, is that for some individuals the reflex of the black ink on a white paper makes reading difficult. Jansky (1958) also reported a case of a student who was unable to recognize words printed on a plain white paper but was able to recognize words printed on a yellow paper. However, with a struggling reader, there are numerous visual distortions that can occur to make reading incredibly difficult for the child. Visual distortions, also related to visual stress, can be blurring, illusory movement of words and/or letters, skipping of lines, glares or other colors on the pages (Bouldoukian, Wilkins, & Evans, 2002). This visual stress includes eye soreness or headaches when a child is reading and can be identified if your child rubs their eyes, says they have headaches when reading, excessively blinks and/or shows poor concentration while reading. It also posited by Irlen (2005) that children who continue to struggle to learn to read efficiently might, in fact, suffer from Scotopic Sensitivity Syndrome or Irlen's Syndrome (IS). This syndrome is characterized by visual perception distortions that occur most often with high-contrast text (black text on white paper) and result in symptoms that make reading uncomfortable. Such symptoms include seeing the movement of text (i.e., shaking or wiggling), white spaces becoming more pronounced than black text, text fading in and out. Readers may also find that they have difficulty tracking text and may often misread words, skip lines, and develop somatic symptoms such as headaches, nausea, or eyestrain. If children exhibit some of these behaviors, reading specialists and teachers want them to take a break and observe in order to try some of the interventions (Irlen, 2005).

For learners who struggle to read or in instructional level, there are a variety of strategies that are used to aid in the improvement of this essential skill. Colored overlays, which are pieces of thick colored plastic, or colored filters (transparent or translucent), are a tool that has been applied in reading materials to assist readers (Kaminsky, 2013). It has been affirmed in the study conducted by Imaizumi, Furuno, Hibino, & Koyama, (2016) that this intervention has been found to alleviate visual distortions and discomfort and improve reading accuracy. As believed by Ritchie, Della Sala, and McIntosh (2011), this would theoretically improve the reading rate of the learners in the short-term and aid the development of reading skills in the longer term.

The overlays can help students focus more on groups of words and the connections between them, instead of focusing on trying to make out individual letters and words. Using overlays will potentially allow teachers to work on comprehension and more advanced reading skills with students, as Imaizumi, Furuno, Hibino, & Koyama (2016) stated. The most important point, though, is not to let the overlays do the teaching, the use of overlays must be followed up with individualized, remedial teaching to help the reader regain confidence and an appropriate skill level, Imaizumi, Furuno, Hibino, & Koyama (2016) added.

Thus, the researcher thought it is wise to use colored overlays to learners who belong to the instructional level of reading, as it is concluded that it seems to improve the rate of reading (Evans, Cook, Richards, & Drasdo, 1994). It further determines the effect of colored overlays on a reading rate of learners in the instructional level of reading.

## FRAMEWORK

Two theories that have attempted to explain the mechanisms underlying the beneficial effects of colored filters on reading are the Magnocellular Deficit Theory and the Cortical Hyper-Excitability Theory (Bouldoukian, Wilkins, & Evans, 2002).

According to this theory, termed the Magnocellular Deficit Theory, it is believed that dysfunction occurs in the neural pathway that sub serves vision. The two systems of cells that aid in the process of reading, the Magno System and the Parvo System, work together to aid perception of the text. The Parvo System codes information about color and detail, while the Magno System is responsible for inhibiting the Parvo System when the eyes are in motion so that images are perceived as stationary even though the eyes are moving across the text.

The Cortical Hyper-Excitability Theory (Wilkins, 2003) postulates that the effects of overlays occur because different colors can cause a shift in the major locus of activation away from hyper-excitable areas of the visual cortex to areas that are less hyper-excitable. The individual's cue for optimal overlay choice is his/her perception of reduced perceptual distortion in response to the specific overlay/s selected. However, although color can often be the key, not any color will do. For each individual, there is a specific hue (tint) and saturation (depth of color) that will "work" best. So, it is important that a sufficiently wide selection of colors is provided so that everybody's needs are met. In some cases, individuals requiring a deeper saturation double up two overlays of the same color to achieve the desired effect.

The colored light filters sample, color space in an order and scientific manner, systematically and efficiently, have been shown to improve reading speed in children significantly (Wilkins, 2002; Jeanes et al., 1997) and adults (Bouldoukian, Wilkins, & Evans, 2002) with pattern glare but otherwise normal visual function (Scott, et al. 2002) when placed over printed text at near distance, under average classroom or home lighting conditions. As what Wilkins (2002) stated, each reader could benefit from the use of the colored overlays only if the color of the overlay is a specific color. They continue that in a straightforward testing procedure, pairs of colors are compared successively. The child is asked to judge which color makes the text easiest to read. The Wilkins Rate of Reading Test can then be used to measure the amount of improvement in reading efficiency brought about by using the chosen color. Research and classroom experience had proved conclusively that the use of a colored overlay of the correct color could do much to increase the reading speed, comprehension and comfort of many children.

## FRAMEWORK

Figure 1 shows the schema of the study. Ages of the learners were included in the study because it seems that the critical beginning age is about 7-8 years old. This will give other researchers the background to their reading experiences and their problems in reading as well. It is most likely in the sex to know their color preferences in which supported by a large body of research that sex and age are some of the factors influencing color preference in humans (Chiu, Gervan, Fairbrother, Johnson, Owen-Anderson, Bradley, 2006).

Learners enjoy reading without visual distortions. Colored overlays may very well be the doorway to a love of reading for these learners (Mason, 2013). This would be the tool to help instructional readers to increase their reading fluency as well as speed and reducing visual perception distortions. Furthermore, this will also help in decreasing the visual stress experienced by learners as they read. However, they do not guarantee success for everyone. In order to garner the best results from colored overlays, there should be a careful diagnosing in the reading problem, choosing the correct color for each individual, and continue faithfully in reading instruction. Using these tips, learners who are instructional readers have the hope of opening a book without frustration and reading a story for fun (Mason, 2013). Once they find reading easier, their self-esteem will increase and they will be much more confident about other learning tasks too.

## OBJECTIVES OF THE STUDY

This research sought to answer the following objectives, (1) to determine the reading rate of the experimental and control group in the pre-test, (2) to determine the reading rate of the experimental and control group in the post-test, and, (3) to determine the significant difference between the control and experimental groups' reading rate.

## METHODOLOGY

### Research Design

This study utilizes the experimental method of research. Experimental designs are characterized by the random selection of participants and the random assignment of the participants to groups in the study. The researcher also has complete control over the extraneous variables. In this design, the respondents are randomly assigned to two sample groups: the experimental and controlled group. Then, it established a change to the experimental group and not the control group. There was only one variable being manipulated and tested though It is possible to test more than one, such experiments and their statistical analysis tend to be unmanageable and difficult.

The procedure involved random assignment of participants to two groups: the experimental and the control group. Before they were given the pre-test, they were given their visual testing to check on their vision. Subsequently, both groups were administered with a pre-test without the use of colored overlays. Then, they were given the post-test. The experimental group used the colored overlays as their reading intervention; while the control group without color overlay.

In this study, the rate of reading was assessed. The study also attempted to know the effects of using colored overlays in one group as part of their reading intervention in their rate of reading.

### Research Site

The experiment using Colored Overlays as their reading intervention was done at the School Library of Bongbongon Elementary School, North II-District, a public school located at NHA - Kauswagan, Cagayan de Oro City. The said study was conducted by a teacher-librarian for about two weeks during noon breaks and after the participants' classes.

## **Participants**

This study was conducted in Bongbongon Elementary School, NHA-Kauswagan, North-II District, Division of Cagayan de Oro City. Particularly, the Grade Two identified Instructional Level of learners of the said school were involved. The respondents of this study were the fifty-two (52) Grade Instructional Level of learners of Bongbongon Elementary School, aged between six to eleven years old. The selection of the respondents was based on their age, gender, and First Quarter grades of the learners. The pretest results of their PHIL-IRI, without the use of the colored overlays, were also considered.

## **Instrumentation**

This study adopted two types of research instrument. The first questionnaire was utilized to determine the socio-demographic profile of the participants. It was used to distinguish their age and sex. The second set of research instrument was the passages taken from the Philippine Informal Reading Inventory (PHIL-IRI) used by the Department of Education particularly the English-oral in determining the reading skills of the learners in the elementary level.

The Philippine Informal Reading Inventory (PHIL-IRI) was no longer validated since it is considered as standard and validated. The questionnaire on the demographic profile was no longer validated as well since it is widely used by the participants.

## **Data Gathering Procedure**

The researcher secured a letter of permission to conduct the study addressed to the Schools Division Superintendent of Cagayan de Oro City, school heads, administrators, principals, and teachers. A separate letter was given to the parents of the participants. Upon the receipt of approval of the approved request, the researcher then started with the visual testing of the participants. The school nurse was the one who checked the vision of the participants. She was sent for training as a vision screener in the school. After, the researcher started with the one-on-one oral reading in English with the learners identified as instructional level.

Prior to application of the intervention, the pretest result of Phil-IRI conducted on June in the Grade two level was used as the basis for choosing the instructional level of learners. By then, the researcher had a random assignment; the control group and the experimental group with the reading intervention through

colored overlays. After two weeks, posttest using the Phil-IRI was conducted to the 52 Instructional Level of learners, the experimental and the control group. The Grade 5 Teacher was the one who conducted the procedure. The control group just read the passages without color overlays while the experimental group was given time to pick their choice color of the overlays. After they were able to pick their desired color, the teacher then started to conduct the experiment using the Phil-IRI passage appropriate to their level. Then, they were asked to read a passage according to their levels. The Phil-IRI test lasted for about two weeks for five to six respondents per day, during lunch break and after their classes. This was strictly followed to avoid disruption of classes.

To increase external validity, the color overlays used by the respondents are tinted plastic reading sheets by Irlen Institute ordered from their website. This imitates the typical implementation by a parent or educator, as there are a variety of options available outside of the realm of the Irlen Institute. The colors of overlays included pink, orange, yellow, red, light blue, and dark blue. Each overlay was 8.5" × 11" to cover the entire reading passage and surrounding white areas.

### Statistical Analysis

The statistical treatments used were the measure of central tendencies; mean, frequency counting, standard deviation, and percentage. Also, Analysis of covariance (ANCOVA) was used in examining the differences in the mean values of the dependent variables that are related to the effect of the controlled independent variables while taking into account the influence of the uncontrolled independent variables.

## RESULT AND DISCUSSION

Table 1. Reading Rate of the Participants in the Pretest

Pretest	Minimum	Maximum	Mean	Standard Deviation
Control Group	12	56	32.31	10.943
Experimental Group	15	63	36.69	12.917

Table 1 shows that the control group has a minimum word per minute of 12 and the experimental group has a minimum word per minute of 15 in the pretest. In addition, the control group has the maximum word per minute of 56 and

the experimental group has a maximum word per minute of 63. The minimum and maximum words per minute in both groups are comparable. It seems that the experimental group has a higher pretest mean score than that of the control group; however, the difference is not that significant. Hence, the two groups have comparable skills in reading.

The Phil-IRI passages given to the 52 Instructional Learners during the pretest was new to them since the passages are all appropriate for grade two level of learners. Below are the passages from the Phil-IRI that was utilized in the pretest.

They were given a pretest to determine their baseline whether they are under the frustration, instructional, and independent level of learners in the Phil-IRI, which lasted for about a minute.

Table 2. Reading Rate of the Participants in the Posttest

Posttest	Minimum	Maximum	Mean	Standard Deviation
Control Group	31	88	73.12	16.988
Experimental Group	21	88	75.04	17.038

Table 2 shows the result of the posttest. The table illustrates that the control groups' minimum word per minute is 31 while the maximum word per minute is 88. Furthermore, the minimum word per minute of the experimental group is 21 while the maximum word per minute is 88 which is also the perfect number of words. This concludes that the minimum and maximum word per minute of the groups is comparable. This can be gathered from the data that the experimental group appears to have a higher posttest mean score than that of the control group. The data imply that the learners in both control and experimental groups are comparable in terms of their reading rate. From the results of the greater posttest mean of the experimental group supports the studies of Lightstone et al. (2002) and Nicholls H.L. & Critten S. (2015), as color overlays significantly increase the reading rate of the participants especially using their chosen overlay.

The Phil-IRI passages used during the posttest conducted by a teacher-librarian of Bongbongon Elementary School was also new to the participants. Below are the passages from the Phil-IRI that was utilized during the posttest.

The passages utilized were level-appropriate intended to the grade two levels of learners. The assessment lasted for about a minute for each participant.

Table 3. The Extent of Effectiveness in the Utilization of the Colored Overlays before and After the Intervention

Source	Sum of Squares	df	Mean Square	F	Significance (p-value)
Posttest	10524.463	1	10524.463	75.268	.000
Group	217.968	1	217.968	1.559	.218

After exposing the experimental group to the intervention, color overlays, and conducting the posttest to both groups, the data from the pretest and post-test of the two groups were analyzed by using the Analysis of Covariance (ANCOVA). The study used statistical treatment ANCOVA in order to reveal if there was a difference in post-test scores between the groups or not. One Way-Analysis of Covariance (ANCOVA) was conducted at a 0.05 level of significance. In this study, the pretest word per minute is considered as the covariates.

Table 3 indicates that there is no significant difference between the reading rate of the participants in the pretest and post-test of the control and experimental groups after utilizing the color overlays to the latter. These results support the research of Ritchie, Della Sala, and McIntosh (2011) on demonstrating colored overlays as having little effect or no effect on the reading rate of the children. As what Griffiths, Taylor, Henderson, and Barrette (2016) added, they concluded that the use of color overlays to improve reading rate could not be recognized and acknowledged as the benefit is based only on the placebo effect.

The results provide enough statistical provision to accept the null hypothesis of this study. Table 3 shows no significant difference ( $p=.218$ ) with the reading rate of students between the control group and the experimental group since both groups scored higher means after employing the color overlay intervention in the experimental group and the norm instruction in the control group. These results support the study of Stuart J. et al, (2011) that Iren color overlays have no statistical significance and immediate effects on the reading ability in poor readers.

## CONCLUSIONS

From the findings, the following conclusions are drawn about the effects of color overlays as an intervention in reading for the Grade Two Instructional Level of Learners of Bongbongon Elementary School: that the experimental group who receives the intervention registered higher mean difference in the reading rate

in the posttest than the control group; that with or without the intervention, the reading rate of pupils is expected to increase. Lastly, that color overlay as an intervention remains a controversial subject to study.

## RECOMMENDATION

Based on the findings and conclusions formulated, it is recommended that (1) The Department of Education-School Administrators should consider supplying colored overlays for children in the kindergartner levels who are still starting to read. (2) Parents could continue using color overlays at home if the learners started using color overlay as an intervention in school. (3) Since the study is focused on the public schools, other researchers may replicate the study in the private school context. (4) The other researchers may use other levels of reading in the Phil-IRI not just in the instructional level but also use the frustration and independent level of learners. (5) Lastly, future researchers may conduct similar studies on other learners or cases of disabilities for longer durations to further prove the effectiveness of Color Overlays.

## TRANSLATIONAL RESEARCH

The findings of this study could be translated into printed media such as newspapers, published articles, brochures, and posters for information dissemination. This is designed for the dissemination of information for stakeholders from the remote areas in the city.

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