



Development of SCARLIGHT (Stand Camera Magnifier Light) Media for Improving the Seeing Ability of Low Vision

Eviani Damastuti*, Utomo, Sulistiyana

Lambung Mangkurat University, Banjarbaru, Indonesia
** corresponding author: eviani.damastuti.plb@ulm.ac.id*

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Abstract: Experienced limitations in visual function and low vision This results in limitations in the level and diversity of visual experience. Information is obtained comprehensively through the sense of sight, therefore vision is hampered by students' low vision creating a need for learning in students' low vision in terms of educational accessibility. One of the efforts is to provide learning media that adapts to children's needs and vision. This research will develop learning media SCARLIGHT (Stand Which. equipped with a camera, magnifier, and lights that will be connected to a PC (Personal Computer) so that it can make it easier for teachers to teach children with low vision. The method used in this research is research and Development with ADDIE type (Analysis, design, Development, Implementation, and Evaluation). The research location is SLB A Negeri 3 Martapura. Data collection techniques using tests, interviews, and documentation. The research subjects were 6 students with low vision. Results of research into the development of SCARLIGHT Media (Stand Camera Magnifier Light) which is a shaped Stand Camera whose height can be measured according to the student's reading distance requirements vision, and the camera can be adjusted for magnification and focus and is equipped with a light that can be adjusted from dim to bright. The response results from 6 low vision students using SCARLIGHT Media stated that it helped them see objects, helped them read, see colors, and helped them display information or images in their entirety (graphs, tables, maps).

Keywords: SCARLIGHT Media, Ability to See, Low Vision

I. Introduction

Special needs children with visual impairments are classified under blind and low vision. Hallahan et al (2011) explained totally blind is the condition of a person who only has a visual acuity of approximately 20/200 or less, in the better eye even if assisted with vision correction (for example with glasses), or a person who only has a very narrow vision that has a longest diameter of no more than 20 degrees. Low vision is a condition where a person has visual acuity that is between 20/70 to 20/200 in the better eye with vision correction. A person with low vision uses his remaining vision to learn, but his condition disrupts carrying out daily functional activities. The visual limitations possessed by an individual have an impact on limitations in the level and diversity of experience because the information is obtained comprehensively through the sense of sight, for example, information related to size, color, and spatial relationships. According to Lovie-Kitchin et al., (2001), visual impairments that occur in a person will affect the learning process which is hampered, for example, reading because poor reading skills can be a barrier to the educational success of children with visual impairments. In the realm of writing, the impact that appears on individuals with low vision is that they need adjustments to their notebooks or writing tools (Selfiany et al, 2010). The reading development of children with visual impairment 2 shows a lag compared to children with normal vision because reduced visual input has been proven to be an important factor that hinders the reading performance of children with low vision (Gompel, Van Bon WH, and Schreuder in Ramani et al., 2014) individual low vision can read using braille for efficient reading and writing (Corn & Koenig, 2002). In the writing aspect, an individual with slow vision requires special accommodations and learning to develop legible handwriting or a valid signature. The impact of visual impairment on students' slow vision creates a need for learning in students with low vision to be on par with others in terms of educational accessibility. One of the efforts is to provide learning media that adapts to children's needs and vision. Amka (2018) media as all forms programmed for the process of distributing information. Fitriyah & Wijayanti (2020) state

that media is a tool that can help the teaching and learning process which functions to clarify the meaning of the message conveyed so that the objectives of the teaching and learning process can be achieved perfectly.

This research began with observations made by researchers at SLB A Negeri 3 Martapura, researchers found six children with low vision who have different visual function abilities and they can read printed/sighted writing. There are needs for students with low vision. Learning requires accessible learning media. Media or tools with low vision are the most effective use of light and magnification. Light is a tool that must be considered as a tool for low vision because low environmental lighting levels and dim lighting can hinder students' abilities. Low Vision can optimize residual vision. Magnification is the process of increasing the size of an object from the actual size of the object. According to Wardani (2015), magnification can be obtained by (1) increasing the size of the object (size magnification), (2) reducing the viewing distance to the object (relative distance magnification), (3) increasing the viewing angle (relative angle magnification). In line with effective media that can be accessed by students with low vision in learning, this research will develop learning media called SCARLIGHT (Stand Magnifier Light). This media has a stand which is equipped with a camera, magnifier, and lights that will be connected to a PC (Personal Computer) which can be projected via an LCD screen so that it can make it easier for teachers to teach children with low vision. Media SCARLIGHT can support reading activities for low vision because the lesson material can be adjusted to vary in size according to the letters that can be read by low vision. Advantages of Media SCARLIGHT What the researchers will create is that the height of the camera magnifier can be adjusted according to needs, and is equipped with lights as lighting that can clarify the material presented by the teacher.

II. Method

This research is Research and Development (RnD) research. Research using the ADDIE development model developed by Dick & Carry consists of five stages, namely: 1) analyze, 2) design, 3) develop, 4) implementation, and 5) evaluation (Branch, 2009). This research is educational development research (educational research and development) which aims to develop hardware in the form of media SCARLIGHT (Stand Camera Magnifier Light). Research Subjects 6 students with low vision who attend SLB A Negeri 3 Martapura. The description of the implementation of the ADDIE model is as follows: Process analysis carried out through a preliminary study to determine functional vision abilities of students with low vision. Process design is done by planning the media SCARLIGHT (Stand Camera Magnifier Light) based on the analysis results that have been obtained. Activity development This is done by creating media that has been designed. Process implementation This is done by conducting media trials and directly involving low vision in the use of applications that have been designed and developed. The final stage, evaluation This is done by making improvements to the results of the trials that have been carried out so that the application becomes feasible and can truly facilitate the learning media needs of students' slow vision.

III. Results and Discussion

Visual barriers experienced by students with low vision raise different learning needs from sighted students, namely the ability to use or maximize residual vision to follow the learning process. Therefore, it is necessary to assess to determine the remaining functional vision in six low-vision students at SLB A N 3 Martapura. Assessment results from six students with slow vision without any other obstacles at SLB A Negeri 3 Martapura show that each student with low vision can recognize objects at varying distances from those closest to the organ of vision, namely 5 cm, to close to normal viewing distance, namely 25 cm. Cautionary writing can also be read by low vision students on average at a distance of 20 cm which also varies, ranging from 12-point size to 48-point size. According to the Ministry of Social Affairs of the Republic of Indonesia (2009), low vision is someone who has impaired or impaired visual function but still has residual vision that can be used to carry out work or daily activities, including reading and writing. Apart from that, Lowenfeld (Tarsidi, 2011) added that visual impairments in low vision have a significant impact on cognitive development, namely the limitation of individuals with visual impairments in obtaining a variety of distribution and types of experiences. The need for magnification and lighting in student learning media with low vision is very important to help students with low vision follow a learning process

based on the results of assessment analysis. The results of this assessment are in line with Trunbull et al (2002). Generally, students with low vision can learn using their visual senses; however, they may need to enlarge the print, increase the contrast, or change the type or size.

Things that researchers consider when creating and developing learning media SCARLIGHT namely six students with low vision These students are still able to use their remaining vision to follow the learning process even though they have different needs. Therefore, to make it easier for them to use their remaining vision, this media was created. This media is called SCARLIGHT (Stand Camera Magnifier Light) and is a shaped tool Stand Camera whose height can be measured according to the student's reading distance requirements low vision, and the Camera can be adjusted for magnification or enlargement and focus. Apart from that, SCARLIGHT is also equipped with lights that can help low-vision students see writing/objects. Low vision still has functional vision remaining so that he can still read and write using normal writing with adjustments to one or three aspects, namely lighting, use of glasses, and magnification (Wardani, et al, 2015)



Fig. 1. Prototype Media SCARLIGHT

At the level of development, Media SCARLIGHT. The results of the technician's development are different from the initial design/prototype where the camera and lights were initially combined in one place, but in the development results the camera and lights were separate. However, there are advantages to the results of Media development SCARLIGHT. This means that the lighting can be adjusted from dim to bright. This will make it easier to choose a light that is comfortable for students with low vision. Heward (2000) Extra light sourced in student areas can be beneficial for some Low vision students. For Stands there cannot be any differences from the initial design, Stand The height can be measured according to the student's reading distance requirements low vision. Providing easel holders to hold reading materials can help blind students read more easily (Barraga & Erin, 1992).



Fig. 2. SCARLIGHT media



Fig. 3. SCARLIGHT media connected to a laptop

SCARLIGHT media can function to help low vision people to read, recognize colors, recognize objects, and help teachers convey lesson material in the form of textbooks. This media can be used by connecting a PC (Personal Computer) or laptop so it can be used individually. Media SCARLIGHT can also be projected via an LCD screen, making it easier for teachers to teach children with low vision either classically or with additional applications, it can be connected between low vision students' laptops. Based on student responses slow vision using SCARLIGHT Media recorded from 6 students with low vision helped by using SCARLIGHT media. All low-vision students agree that SCARLIGHT media can help see objects, enlarge writing so that it can help read, help see colors, and help display information or images in their entirety.

Students with vision with the initials ADF can read sighted letters with a size of 18 points with reading distance of 21 to 25 cm after using the media SCARLIGHT. ADF can read sighted letters with a size of 12 points at a distance of 29 cm with medium lighting settings, and 3x magnification. Low vision students with the initials GPA are unable to recognize sighted writing but can recognize objects or geometric shapes at a reading distance of 15 cm after using SCARLIGHT media. GPA can recognize geometric shapes at a distance of 40 cm with the help of the brightest lighting, 4x magnification.

The low-vision student with the initials FTH can read 36-point sight words with a reading distance of 21 to 25 cm after using SCARLIGHT media. FTH can read 16-point sight words at a reading distance of 23 cm with 4x magnification and the brightest lighting settings. Low vision students with the initials FTH can read sighted writing with a size of 48 points with a reading distance of 25 cm after using SCARLIGHT media, FTH students can read sighted letters with a size of 14 points at a reading distance of 25 cm with 4x magnification and the brightest lighting.

The low-vision student with the initials MIL was able to read sight writing measuring 14 points at a distance of 5 cm after using SCARLIGHT media. After using SCARLIGHT media the student was able to read sight writing measuring 14 points at a distance of 10 cm with 5x magnification and bright light settings. Low vision students with the initials SAC can read sight writing at 12-point size at a distance of 15 cm after using SCARLIGHT media, SAC students can read 12-point size writing at a reading distance of 30 cm with 2x magnification and moderate lighting.

Results of implementation of media use SCARLIGHT on 6 students with low vision show that a careful font size of 12-14 points can be read by students with low vision. If magnification is carried out to a maximum of 5x magnification and bright lighting settings, it can reduce students' reading distance low vision. Teacher who teaches students vision everyone agrees that the media SCARLIGHT help student's low vision in reading and writing carefully, seeing objects, recognizing colors and providing complete information or images (graphs, tables, and maps) Input from teachers

to improve the media SCARLIGHT among others: a) Media SCARLIGHT is given an additional place to place books/teaching materials and clamps that can be moved to the left and right. B) Media SCARLIGHT is made more flexible by being able to shift automatically according to the child's reading speed.

The final stage carried out in Media development SCARLIGHT namely the evaluation used as a benchmark in improving the media SCARLIGHT by making improvements based on input provided by low vision students and teachers who teach students low vision.

IV. Conclusion

Based on the research conducted, it can be concluded that the development of SCARLIGHT Media can help students with low vision at SLB A Negeri 3 Martapura to see objects, read, see colors, and help display complete information or images (graphs, tables, maps).

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