

# *E-Biotic Digital Literacy in Science Learning for Students with Hearing Impairment*

Iva Evry Robiyansah, Toho Cholikh Muthohir, Soedjarwo

Graduate School

Universitas Negeri Surabaya

Surabaya, Indonesia

evyrobiansah@gmail.com, tohocholik@unesa.ac.id, soedjarwo9@gmail.com

**Abstract**—Literacy activities for students with hearing impairment can be done by implementing literacy-based learning. Digital literacy learning can be done using E-Biotic which is an android based application on learning science. This study uses a development research design, with data collection techniques through questionnaires and observations. The result of questionnaire reports that the response of students with hearing impairment is very positive in using this application. Moreover on the assessment process in science learning using that application it found that the average percentage of individuals from students with hearing impairment had activeness, attitude and high interest in science learning. The learning outcomes of science using E-Biotic digital literacy for students with hearing impairment by using gain scores obtained improved results compared to the results before using E-Biotic application. And it can be concluded that the use of E-Biotic application has proven effective to improve digital-based literacy for students with hearing impairment.

**Keywords**—digital literacy; listening; speaking; students with hearing impairment; hard of hearing

## I. INTRODUCTION

Understanding literacy for children with special needs must be comprehensively understood. Special education teachers must use specific strategies to understand children's learning characteristics so that teachers can motivate students to fulfil students' curiosity desires and make students who think critically and have high reasoning ability [1]. A strategy is needed to understand the implementation of literacy in a special school, especially in creating a special school that is literate and creative [2].

Literacy movement in special education can be done in various ways, one of which is by conducting a literacy-based learning program. The definition of literacy in a broad sense is not more than just reading and writing but also includes thinking skills using sources of knowledge in digital, visual, print and auditory forms. In the era of technological development, the increasingly rapid use of digital literacy is essential and more effective. Digital literacy is as essential as reading and writing because by using digital literacy, individuals can interact with the surrounding environment quickly and efficiently [3]. Digital literacy can be done using digital media, one of which is using a Smartphone.

[4] digital literacy can be interpreted as an understanding of using information by using various sources that can be accessed through computer media. So that someone is required to be able to operate the computer properly as a means of obtaining information. Moreover, [5] defines that digital literacy starts from computer-based literacy and literacy originating in obtaining information. While [6] stated that the principle in the development of digital literacy is at least three principles. Namely, first, enhancing digital competencies which include skills, concepts, approaches and behaviours. Second, the use of digital media that refers to the application of digital competencies that relate to specific contexts. Third, doing the digital transformation that requires creativity and innovation in the digital world in the current era.

So it can be concluded that digital literacy is the ability to use digital media ethically, and it is responsible for obtaining information and communicating [7]. Digital literacy enables people to think critically, creatively and innovatively, communicate more smoothly and can collaborate with many people. With digital literacy, information can be done anywhere, anytime and by anyone. With digital literacy, communication is faster, cheaper and more accessible.

The implementation of digital literacy-based learning for children with special needs is carried out by implementing literacy-based learning. [8] literacy activities at the learning stage aim to develop the ability to understand the text and relate it to personal experience, critical thinking, and creatively processing the communication skills through verbal, written, visual and digital and can respond to texts related to the material. So there are academic objectives related to subjects.

In Science learning material about living things, it can be done by using visual-based digital technology which aims to improve students in digital literacy-based learning to improve digital skills to improve technology literacy understanding and improve the quality of science learning with literacy culture [9].

Digital literacy activities related to science subject in children with special needs, in this case, are students with hearing impairment, the implementation of digital literacy can be done by using media that is adjusted to the characteristics of children with special needs in this case are students with hearing impairment who are visual learners, so that digital

literacy is used expected to be able to make learning more effective and efficient and with digital literacy is able to motivate students and can stimulate attention, the interest of students in reading so as to create an atmosphere of learning that is fun for students and foster a culture of literacy in schools. Based on problem analysis, this research tries to develop a culture of literacy among students with hearing impairment through E-biotic digital literacy in learning Science.

## II. METHOD

The design of this research was development research. In making of E-Biotic digital literacy application in Science learning for students with hearing impairment, the researcher worked with informatics experts to create a product, namely E-Biotic Digital Literacy learning for students with hearing impairment. It is in line with the definition of development research [10].

Data were collected with a questionnaire and also by observing the user by using an observation sheet. Data were collected quantitatively and analyzed qualitatively to obtain a clear picture of the effectiveness and practicality of using E-Biotic digital literacy in literacy-based Science learning for students with hearing impairment in Public Special Junior High School in Pasuruan City, East Java Province, Indonesia.

## III. RESULT AND DISCUSSION

### A. Result

#### 1) Description of E-Biotic Digital Literacy

E-Biotic application is an acronym for Electronic - Biotic, which means an electronic book in the form of an application about living creatures (biotic) based on android. In the E-biotic application consists of making the interface design that is needed in the application, the design is arranged in a planned and structured manner with an attractive appearance consisting of the main menu, namely a menu about living things, a menu about the explanation of living things, a menu about traits and examples of living things. Equipped with an attractive picture display that makes students with hearing impairment who are visual learners have an interest in learning science [11].

E-Biotic digital literacy in science learning for students with hearing impairment also facilitate parents and teachers who want to introduce various living things in nature. In making android-based E-Biotic digital literacy, it used a structured and systematic navigation structure to run E-Biotic digital literacy applications, making it easier for users of digital literacy applications, especially students with hearing impairment.

#### 2) The Use of E-Biotic Digital Literacy

The use of Digital E-Biotic literacy in science learning based on literacy for students with hearing impairment is carried out with the following stages:

- a) Introduce E-Biotic digital literacy in literacy-based Science learning for students with hearing impairment.
- b) Install smartphones of students with hearing impairment with E-Biotic digital literacy on each of the students with hearing impairment 's mobile phone.
- c) If E-Biotic's digital literacy has been installed and runs on the students mobile phone, students will automatically read and play this digital literacy application with the guidelines contained in the E-Biotic digital literacy application.
- d) Implementation of literacy in learning using E-Biotic digital literacy in science learning for

### B. Discussion

Data from questionnaires which were conducted on students with hearing impairment will be presented in the form of graphs and tables to facilitate analyzing the results of student responses in learning digital literacy using the E-Biotic application in improving science learning for students with hearing impairment.

Based on the percentage from the questionnaire, it was found that the students' response was very positive in using E-Biotic digital literacy. It can be seen from the questionnaire results, 93% of students with hearing impairment strongly agree on the use of E-Biotic digital literacy application in science learning and only 0.7% of students with hearing impairment give a response of agree. It proves that the E-Biotic digital literacy application provides a very good response in science learning.

E-Biotic digital literacy is an android-based application which is a visual media in Science learning for students with hearing impairment, this media is in accordance with the characteristics of students with hearing impairment so that students with hearing impairment are interested because learning is more fun and can be done anywhere without being tied to time and place [12]. This is in line with literacy management in children with special needs. Notably, for students with hearing impairment, all information should be presented visually. It is intended so that students with hearing impairment can understand the lessons the same as typically developing students so that it is expected to be able to improve the learning of Science for students with hearing impairment especially in the conceptual understanding of living things.

Based on the assessment process in science learning using E-Biotic digital literacy application, it was found that the individual average percentage of students with hearing impairment had activeness, attitudes and high interest in science learning using E-Biotic digital literacy. The percentage generated in the learning process is 98%. Students with hearing impairment look active in learning Science by using digital E-biotic literacy; they are enthusiastic and learn together with a fun atmosphere.

From the above analysis, it is known that the results of literacy-based science learning using E-Biotic digital literacy for students with hearing impairment have increased results compared to results before using E-Biotic digital literacy. Furthermore, it can be analyzed that the use of the E-Biotic application in science learning has proven useful to improve digital-based literacy for students with hearing impairment. Because by mastering and being able to operate digital literacy (E-Biotic) thus students with hearing impairment will be able to understand the text in the E-Biotic application so that the ability of students can increase in terms of understanding about living things, the characteristics of living things, alongside with the example of living things.

The use of E-Biotic digital literacy in the science learning is in line with the characteristics of students with hearing impairment who are visual learners so that media utilization can optimize learning for students with hearing impairment by using the E-Biotic application. Moreover, science learning becomes more enjoyable. Students learn by reading each menu and are accompanied by an exciting picture so that students with hearing impairment feel comfortable and can learn Science optimally in understanding the concept of living things.

So with E-Biotic digital literacy, students with hearing impairment can improve the culture of literacy in special public junior high schools in Pasuruan City and also improve the science learning process and learning results of the deaf.

#### IV. CONCLUSION

Based on the research on E-Biotic digital literacy in Science learning for students with hearing impairment in the process and results, it can be concluded that the use of E-Biotic digital literacy, seen from students with hearing impairment have activeness, attitude and high interest in science learning using E-Biotic digital literacy. Moreover, the

use of the E-Biotic application on Science has proven to be effective in improving digital-based literacy for students with hearing impairment. It is because by mastering and being able to operate digital literacy (E-Biotic), students with hearing impairment will be able to understand the text in the E-Biotic application. Thus the students' ability can highly increase in terms of their understanding about living things, the characteristics of living things, and the example of living things.

#### REFERENCES

- [1] T. L. Good and A. L. Lavigne, *Looking in classrooms*. Routledge, 2017.
- [2] S. Sumarni and M. S. Kuswardani, "The Importance of Literacy on Product Design Concepts," in *Third International Conference of Arts, Language and Culture (ICALC 2018)*, 2019.
- [3] J. Gurney-Read, "Digital literacy 'as important as reading and writing,'" *Telegr.*, 2013.
- [4] P. Gilster and P. G. Gilster, *Digital literacy*. Wiley Computer Pub. New York, 1997.
- [5] D. Bawden, "Information and digital literacies: a review of concepts," *J. Doc.*, vol. 57, no. 2, pp. 218–259, 2001.
- [6] R. Sharpe and G. Benfield, "Internet-based methods," *Res. methods Methodol. Educ.*, pp. 193–201, 2012.
- [7] T. Shopova, "Digital literacy of students and its improvement at the university," *J. Effic. Responsib. Educ. Sci.*, vol. 7, no. 2, pp. 26–32, 2014.
- [8] D. R. Krathwohl and L. W. Anderson, "Merlin C. Wittrock and the revision of Bloom's taxonomy," *Educ. Psychol.*, vol. 45, no. 1, pp. 64–65, 2010.
- [9] V. S.-Y. Fan, "Strategies for Integrating Digital Technology in Classrooms to support English Language Learners' Learning and Engagements," 2016.
- [10] S. Tarsito, "Metode Penelitian Kuantitatif, Kualitatif dan R&D," *Alf. Bandung*, 2014.
- [11] C. Greenhow and B. Robelia, "Old communication, new literacies: Social network sites as social learning resources," *J. Comput. Commun.*, vol. 14, no. 4, pp. 1130–1161, 2009.
- [12] G. F. MITCHELL, "Sustainable Development and Health," *J. Natl. Sci. Found. Sri Lanka*, vol. 20, no. 2, 1992.