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Analysis of the Use of Android-Based Edusan Learning Media on Students' ICT Literacy Skills

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Abstract: This study aims to describe students' digital literacy after learning science using android-based Edusan learning media. The research was conducted at SMP Negeri 2 Mlati using descriptive analysis research method. Edusan application based on android is used as a medium for delivering teaching materials and evaluation tools in the learning process. The data collection technique in this study was a questionnaire. The dimensions of digital literacy analysed in this study are creativity, collaboration, communication, the ability to find and select information, critical thinking and evaluation, e-safety, functional skills and beyond. Results The research shows that students have a very good category in the digital literacy dimension. Therefore, it can be concluded that the use of Edusan android-based learning media can foster and train students' ICT literacy.

Keywords: Edusan; ICT literacy; Learning media

Introduction

The development of the world is now entering the era of the industrial revolution 4.0 or the fourth world industrial revolution where information technology has become the basis of human life. Preparing graduates who are qualified and able to compete globally, and master technological developments is important for everyone and important for the future of a country (Kanematsu & Barry, 2016). Along with the rapid development in the industrial era 4.0, the development in the field of Information, Communication, and Technology (ICT) is also increasing rapidly. Not only in the industrial sector, but also in the education sector. One of them is seen in the use of learning media that utilize ICT which is considered easier, more effective, and more efficient. The 21st century is characterized by technological acceleration. The rapid development of information and communication technology has an impact on all aspects of life, including the learning process. Facing learning in the 21st century is critical thinking skills, ICT literacy knowledge and skills, information literacy, literacy, and information literacy media, and mastering information and communication technology, which must be owned by everyone (Umayah and Riwanto, 2020). Therefore, it can be understood that ICT literacy is one of the skills that can support education.

ICT literacy is a combination of several types of literacy, namely information technology literacy, information literacy, technology literacy, media literacy, and visual literacy. Digital literacy is the ability to manage, and sort out the right applications to use and a deep understanding of the content of digital information (Brown et al., 2020). ICT literacy is one of the 21st-century skills that people must have in dealing with the development, characteristics, features, and effects of digital technology (Zhang, 2016).

Hague & Payton define digital literacy as an individual's ability to apply functional skills to digital devices so that a person can find and select information, think critically, be creative, collaborate with others, communicate effectively, and still pay attention to electronic security and the evolving socio-cultural context. In the educational context, good digital literacy

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also plays a role in developing one's knowledge of certain subject matter by encouraging students' curiosity and creativity (Hague, 2017).

Digital technology has spread to all levels of society but most people have not been able to use this technology properly. Improper use of digital technology can have an adverse effect on the continuity of individual and social life. Therefore, digital literacy should be expanded in order to educate the nation's personality. Historical and cultural context, sharing and creation, information and data, tools and systems are dimensions of digital literacy. Through knowledge of the dimensions described, material content and digital literacy learning procedures can be expanded both inside and outside school (Mustofa, 2019).

Education unit literacy activities cannot rule out the possibility of collaborating with other institutions, communities, and people outside the school environment. Public involvement is needed because schools cannot carry out their own vision and mission. Therefore, various forms of collaboration and collaboration between communities and educational units outside of schools are needed in strengthening character education. There are various forms of collaboration that can be carried out in the context of developing student character education in facing 21st-century education, namely collaboration (Khasanah & Herina, 2019).

In children, the influence mainly lies in the development of brain, emotional, social, and cognitive abilities. The intensity will affect the perception of what they watch. This concern, for example, comes from the influence of violence on children, which is often imitated. In addition, shows that the smell of sex and mystical are a concern for mothers. For teenagers, soap operas with teenage themes tend to exploit the lives of teenagers from one side. This situation causes adolescents to be unable to learn the real reality (Novianti, 2018).

The general factor of the digital world is its freedom from the limitations of space and time, which allows explorers to be openly guided by individual interests and motivations, a sense of responsibility, and a level of independence and criticality in making choices. The process of individualization of these modern conditions starts with needs and desires that constantly need to be satisfied, and starts with the capacity to construct new media according to the circumstances in which we act (Handayani, 2018).

Digital literacy is very influential on humans, because humans have a great curiosity about something, so it makes it very wide open and large to dig up information from outside and in the media. Humans are very close to information and communication, making them a broader knowledge of the world in knowledge, education, and the latest information on social media (Wahono, 2018).

According to Oktavia & Hardinata (2020), digital literacy skills are closely related to technological literacy. Digital literacy skills facilitate interaction and communication in the learning process (Irhandayaningsih, 2020). The use of technology in learning can affect the way teachers teach. The role of digital literacy in determining the success of learning to face the Industrial Revolution 4.0, so digital literacy must be developed (Dinata, 2021). Digital literacy helps people to obtain, organize, and understand information that is used to improve their quality of life. According to Muliastrini et al. (2021), to face the 21st century, every institution/school must build digital literacy habits in their classrooms/schools. Promoting the values of national identity creates modern habits for the new generation of students from elementary to high school.

According to Ng Wan (2015) and Sugihartati (2018), the reasons for incorporating ICT skills in learners' learning provided by educational institutions and policy makers are (1) to support the smoothness and quality of the learning process so that successful learning outcomes in the digital era can be achieved; (2) to develop 21st-century skills so that learners can succeed in the world of work and (3) to make learners part of a digital society that always utilizes digital information and become lifelong learners. However, the fact is that the ability and insight of people regarding ICT literacy in Indonesia are still relatively low. This is based on a survey by the Ministry of Communication and Information Technology (Kominfo) conducted in 34 provinces with the aim of building a framework to measure ICT literacy in all Indonesian provinces. The national ICT literacy index is 3.47 on a scale of 1 to 4. This shows that the digital literacy index in Indonesia is still below the good level (Kurnianingsih, 2017).

Along with the times, learning media software is varied and increasingly sophisticated. The rapid development of information technology and the abundance of digital information. Android-based smartphones also support the ease of accessing this information. This is expected to bring the learning process and learning media in a dynamic digital direction, so that science is easily accessible online and offline, without being limited by space, cost, and time. The utilization of smartphones as a tool for accessing learning materials is not only limited to surfing the internet, but nowadays educators who are quite proficient in technology, always innovate to design learning media. Integrated with learners' gadgets or Android-based applications with some software or developer applications. It is expected that teachers and learners become technology literate.

Mobile learning is another way to develop educational media. Mobile learning can be seen to improve education over time and space (Darmawan, 2016). Use of Mobile Learning according to Junita (2019),

the advantage is that it facilitates the process of teaching and learning activities that take place either inside or outside the classroom which can attract the attention of students and generate enthusiasm and motivate students to learn so that they can convey and understand the content provided appropriately. Another benefit of using mobile learning is that it can support students' independent learning. The use of this media is not without reason, in addition to facilitating learning and being practical, can be accessed anywhere and anytime, also paperless. One of the learning media used is android-based learning media designed using the Edusan application. In the application, there is a summary of the material, practice questions, and practicum instructions.

Research on digital literacy has previously been conducted at IT Al-Hikmah Junior High School in 2022 by Deudeu Anggia (2022), with the research title Analysis of Digital Literacy Skills of Junior High School Students in View of the Use of Mobile Learning Applications on the Concept of the Human Circulatory System. The result of this study is that the level of digital literacy of students is at a high level in terms of the use of Android-based mobile learning through the scores obtained in the questionnaire.

Another study was also conducted by Siti Nurkhasanah (2022), with the title Use of Online Game Media Through ProProfs to Improve Student Digital Literacy at SMP Negeri 1 Gangga. The results of this study indicate that the use of online game media through ProProfs can improve the digital literacy of students in class IX.1 SMP Negeri 1 Gangga on static electricity material in the 2021/2022 academic year. In addition, online game media through ProProfs is easy and practical in making and playing, so it makes students happy to play it and becomes a solution to using cellphones more effectively in learning.

Method

This research was conducted at SMP Negeri 2 Mlati with descriptive analysis research method and included in the type of survey research. Subject The research was class VII students totaling 30 people. The sample selection technique is to use a random sampling system. The data collection technique in this study was a questionnaire. This study aims to analyze digital literacy skills in the dimensions of (1) creativity, (2) collaboration, (3) communication, (4) the ability to find and select information, (5) critical thinking and evaluation, (6) e-safety, and (7) functional skills and beyond learners using Edusan android-based learning media in learning science material on temperature, heat, and expansion. ICT literacy indicators in chemistry learning are presented in Table 1.

The descriptive research method according to Sugiyono (2018) is a study conducted to determine the value of an independent variable, either one variable or more (independent) without making comparisons or connecting with other variables. This means that this research only wants to know how the condition of the variable itself is without any influence or relationship to other variables such as experimental or correlation research. According to Arikunto (2019), descriptive research is research that is intended to investigate the circumstances, conditions or other matters that have been mentioned, the results of which are presented in the form of a research report.

The analytical descriptive research method according to Sugiyono (2018) is a method for obtaining in-depth data, data that contains meaning and can significantly influence the substance of the research. This means that this method presents directly the nature of the relationship between researchers and participants or research objects and subjects. This method also seeks to analyze research subjects in order to obtain in-depth data.

In general, Sukardi (2014) states that the steps for descriptive research are as follows: Identifying significant problems to be solved through descriptive methods; limiting and formulating problems clearly; determining research objectives and benefits; conducting literature studies related to the problem; determine the framework, and research questions and or research hypotheses; designing the research method to be used includes determining population, sample, sampling technique, determining data collection instruments, and analyzing data; collect, organize, and analyze data using relevant statistical techniques; and make a research report.

The results of the questionnaire were then interpreted in accordance with the indicators of digital literacy dimensions such as which are presented in Table 2.

Table 2. Interpretation of Questionnaire Result Data

Percentage (%)	Category
86 - 100	Very good
76 - 85	Good
60 - 75	Medium
55 - 79	Less
≤ 54	Very Less

Result and Discussion

The utilization of android-based learning media designed using Edusan is equipped with materials, practicum guides, and evaluations. The use of technology is considered important in order to keep up with the times and meet the demands of the 21st century. One of the abilities that are the demands of the 21st century is the literacy of students towards ICT. Researchers conducted

research on the analysis of ICT literacy of seventh-grade students at SMPN 2 Mlati by using Edusan learning media based on Android so that it can be accessed through each student's mobile phone. After learning, students fill out an ICT literacy questionnaire which includes dimensions of ICT literacy. The following is an overview of the android-based Edusan application that has been developed by researchers the following results were obtained:

Figure 1. Edusan application

Table 1. Dimensions and Indicators of ICT Literacy in Science Learning

Dimension	Indicators	Number
Functional Skills and beyond	ICT Skills.	1-3
Creativity	Creation of products or outputs in various formats and models by utilizing digital technology,	4
	Creative and imaginative thinking skills include planning, knitting together content, exploring ideas, and controlling the creativity process	5-6
Collaboration	Ability to participate in digital spaces,	7-9
	Able to explain and negotiate ideas with others in the organization group	10
Communication	Able to communicate through the medium of digita technology,	11-13
	The ability to understand the audience (so that when creating content they estimate the needs of the audience and its impact)	14
The ability to find and select Information	Ability to search and select information.	15
Critical Thinking And evaluation	Able to contribute, analyze and sharpen critical thinking when dealing with information.	16
E-safety	Ensure safety while users explore, create, and collaborate with digital technology.	17

(Janssen et al., 2013)

Functional Skills and Beyond

The Functional Skills and Beyond dimension have indicators of the ability to use ICT which are contained in items 1, 2, and 3. Based on the analysis that has been carried out, the following results are obtained

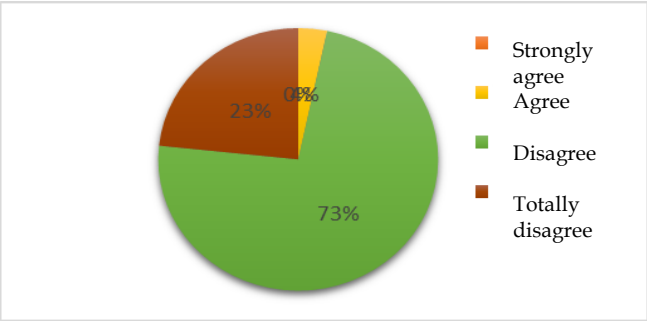

Figure 2. Functional Skills and Beyond Dimension Chart

Based on statement (1) 96.6% of learners can use digital technology to operate a computer or android and fall into the very good category. In statement item (2) it can be said that 96.7% of learners are able to create or disseminate information as a benefit in a social group and fall into a very good category. In statement item (3), 90% of learners can improve public facilities that support digital literacy and fall into a very good category. The mastery of learners in the functional skills and beyond dimension can be said to be very good. Learners have fulfilled the indicators of the ability to use ICT very well.

Creativity

The creativity dimension is found in statement items 4, 5, and 6, the results are as follows:

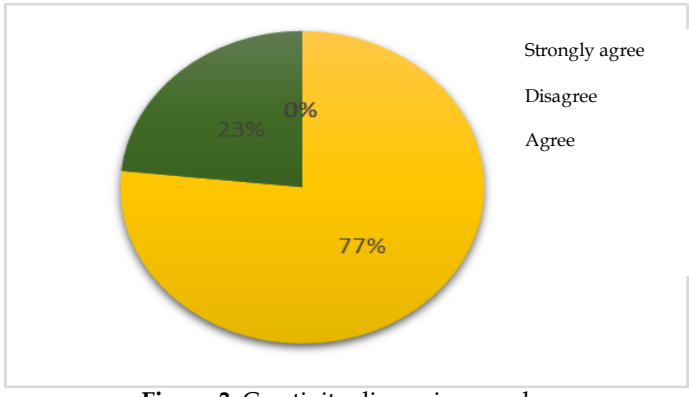

Figure 3. Creativity dimension graph

Indicators of product creation or output in various formats and models by utilizing digital technology contained in item statement (4) obtained 100% of students can improve skills and try new things by looking at tutorials on the internet. Whereas in the second indicator, namely the ability to think creatively and imaginatively, including planning, knitting content, exploring ideas, and controlling the creativity process contained in statement items (5) and (4), 100% of learners can improve their skills and try new things by looking at tutorials on the internet. (6). In item (5), the results obtained were 86.6% of students were able to make writings about learning that were useful for every reader that could be accessed from the internet and were categorized good. Item statement (6) based on the analysis obtained a percentage of 93.9% of learners can use ICT and are able to find learning materials that suit their learning style. This is in the very good category. Learners have fulfilled the indicators of the creativity dimension with a very good category.

Collaboration

The collaboration dimension as an indicator of the ability to participate in the digital space contained in items 7, 8, and 9 which obtained the following results:

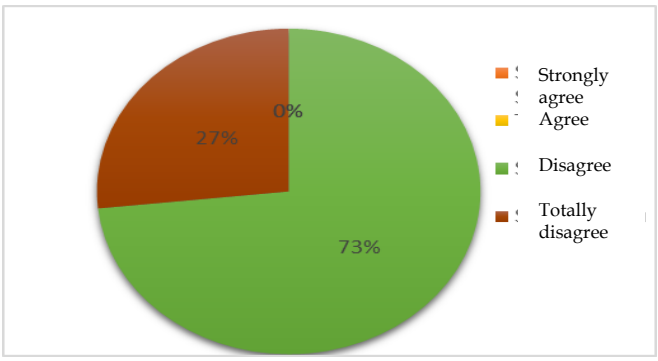

Figure 4. Collaboration dimension graph

In item (7), it can be said that 100% of learners can utilize technology by learning with other friends and fall into the very good category. In item (8), 100% of learners utilize technology to communicate without being limited by time and space. This is in the very good category. Item (9), 93.3% of learners can express their opinions both to the teacher and to other friends in online learning and fall into the excellent category. The second indicator is being able to explain and negotiate ideas with others in the group which is stated in statement item ten. The results of the analysis can be said that 100% of learners can utilize the application to be able to communicate with others. This is in the very good category. The indicators of the collaboration dimension have been mastered very well by learners.

Communication

The communication dimension has indicators of being able to communicate through digital technology media, and the ability to understand and understand the audience (so that when creating content, they estimate their needs). Needs audience and its impact). The communication dimension is found in statement items 11, 12, 13, and 14. The results are as follows:

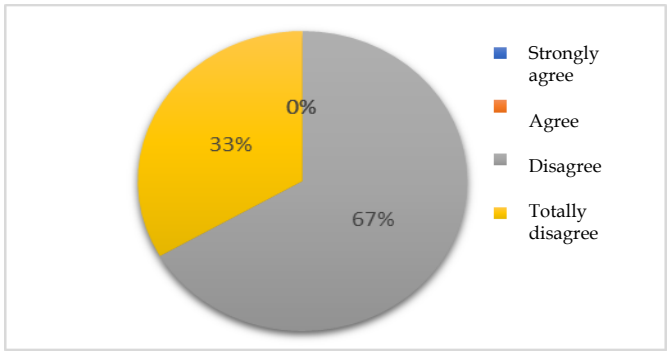

Figure 5. Communication dimensiongraph

In statement item (11), the percentage of learners who can use applications such as Google, WhatsApp, Instagram, or other online applications is 100% with a very good category. Item statement (12), the percentage of learners who can explain the benefits, uses, and impacts of using ICT is 96.7% with a very good category. Statement item (13) shows that 100% of learners can access various kinds of information needed through the internet and is included in the very good category. Item statement (14) can be concluded that 96.6% of students feel that their work is easier with ICT. In the communication dimension, students have mastered the indicators very well.

The Ability to Find and select Information

The dimension of the ability to find and select information has an indicator, namely the ability to find and select information contained in the fifteenth statement item, obtained the following analysis results:

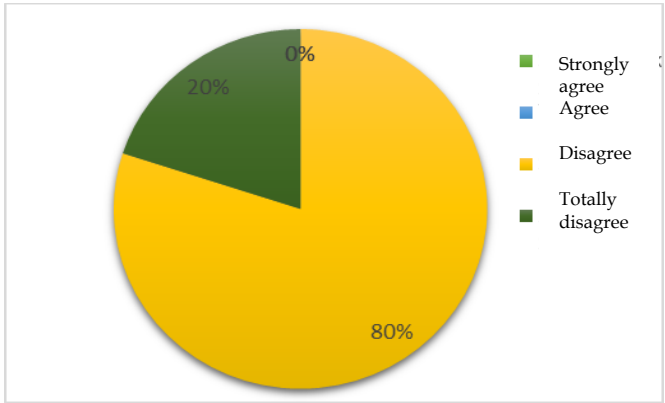

Figure 6. Dimension Chart of The Ability to Find and select Information

It can be said that 100% of learners can recheck the information collected to obtain complete information. This dimension falls into the excellent category based on the learners' mastery of the indicator.

Critical Thinking And evaluation

Dimensions Critical Thinking and evaluation have an indicator of being able to contribute, analyze and sharpen critical thinking when dealing with the information contained in statement item number 16 with the following g results:

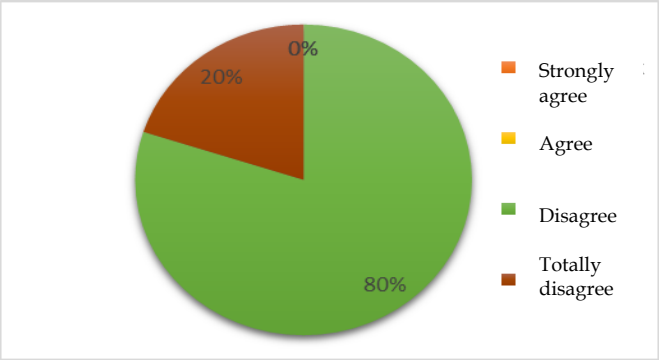

Figure 7. Graph of the Critical Thinking and evaluation dimension

Based on the analysis, it was found that 100% of learners were able to ascertain the correctness of the information obtained and not spread hoaxes. The Critical Thinking and evaluation dimension is in the very good category.

E-safety

In the E-safety dimension, the indicator is to ensure safety when users explore, create, and collaborate with digital technology found in statement item number 17 with the following results:

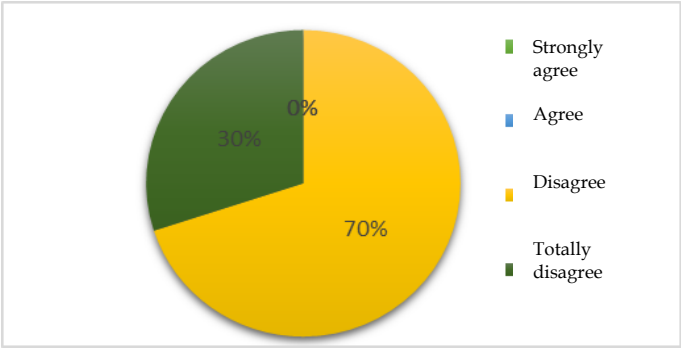

Figure 8. E-safety Dimension Graph

The conclusion is that 100% of learners can maintain the security of their social media accounts and other online accounts. The e-safety dimension is included in the very good category in terms of learners' mastery of the indicator. In general, the ICT literacy skills of seventh-grade students at SMP N 2 Mlati are very good because all dimensions and their respective indicators have been mastered well by students. Learners have been able to utilize technology in supporting the process of the learning process and facilitate all matters in everyday life.

Conclusion

The use of Edusan android-based applications can train and foster students' ICT literacy. Of the seven dimensions of ICT literacy, namely (1) creativity, (2) collaboration, (3) communication, (4) the ability to find and select information, (5) critical thinking and evaluation, (6) e-safety, and (7) functional skills and beyond using Edusan android-based learning media in learning science material on temperature, heat, and expansion shows an excellent category in mastering each indicator. The average percentage of students' ICT literacy mastery is 97.04%.

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Author Contributions

The main author, Hafizha Kurnia Indahsari, contributed to designing research, conducting research, and writing research articles. The second author, Suyanta Suyanta, played a role in guiding the research to writing articles. The third author, Hilman Yusri, played a role in assisting in the implementation of the research and preparing the research instruments used in data collection. The fourth author, Nina Khaerunnisa assisted in the data collection process. The fifth author, Sri Rejeki Dwi Astuti contributed to guiding the writing of the article. All authors have read and agree to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest

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