

# Profile of ICT Literacy in Science Learning Assisted by Google-Sites for Junior High Students

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**Abstract:** Education in the era of revolution must utilize the application of ICT in science learning which can refer to 21<sup>st</sup>- century skills is ICT literacy. The purpose of this study aims to see the effect of Google sites-based science learning on the profile of ICT literacy of junior high school students. The method used is quantitative research by giving post-tests to two different classes that have implemented the learning. The two classes consisted of the experiment class and the control class. The sampling technique used was cluster random sampling. The results obtained were then analyzed and discussed descriptively quantitative. The results show that the application of Google sites-based learning can affect the achievement of students' ICT literacy profile by obtaining an average score of high categories in the experiment class and medium category in the control class. Based result of study, there is a significant influence of the use of Google-sited based in science learning on ICT literacy in junior high school students.

**Keywords:** Google-sites; ICT literacy; Science learning

## Introduction

The industrial revolution 4.0 changes the development of the world of the internet and technology increasingly rapidly. This development concentrates on innovation and maximum use of information, internet, and technology. This era of industrial revolution 4.0 has fundamentally changed the way humans think and made human activities easier (Banu, 2018; Purba et al., 2021). This technology-based development has become very dominant for use in daily activities (Lewin & Mcnicol, 2015; Triyanto, 2020). The impact of the Industrial Revolution 4.0 will affect various areas of life, one of which is education.

Education in this era must be able to integrate technology, information, and communication to make learning easier (Afif, 2019; Hotimah & Raihan, 2020). Skills related to technology, information and communication will be needed to align the world of education with developments in science and technology

(Ngongo et al., 2019). In line with that, 21<sup>st</sup>-century skills are very important to face this era of revolution 4.0. 21<sup>st</sup>-century skills in the world of education will require students to have skills, knowledge and mastery abilities in the fields of technology, information and communication (Chalkiadaki, 2018; Jagodziński & Wolski, 2015; Maulidah, 2019). The application of learning that refers to 21<sup>st</sup>-century skills will produce competitive and skilled graduates, especially in literacy aspects such as technological literacy and human literacy (Aoun, 2017).

Regarding 21<sup>st</sup>-century skills, there are three skills that students must have, namely the first skills which include critical thinking, communication, and creativity. Second, skills in processing information, using media and technology. Third, skills in interacting and adapting (Kivunja, 2015; Triling, & Fadel, 2010). Literacy technological integration is the cultivation of the 21<sup>st</sup> century skills which are collaboration, communication, creativity and critical thinking (Xu et al., 2023; Sofian et

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al., 2023). Based on this, students must have the three 21st century skills to master learning with developments in the current era. One of the skills that can help students develop their skills to support 21<sup>st</sup>-century learning is ICT literacy (Buckingham, 2015; Khlaisang & Koraneekij, 2019).

ICT literacy is the ability to use digital technology to access, manage, integrate, create and communicate information to obtain knowledge (Eliana et al., 2016). ICT literacy can help students to improve 21<sup>st</sup>-century skills in students by referring to the increasingly rapid development of technology, information and communication (Khlaisang & Koraneekij, 2019; Wilson et al., 2015). ICT Literacy Skills It is hoped that it will develop students to process information through various types of ICT-based media (Vacek & Rybenska, 2015). However, research conducted by (Mujiyanto et al., 2022; Rahayu & Mayasari, 2018; Rattanawongsa & Koraneekij, 2015) explains that students are still reluctant to access and explore information digitally using technology. This causes ICT literacy to still be relatively low. This is also supported by the teacher's statement stating that there is no learning media or teaching materials in schools that can facilitate students in ICT literacy.

Learning media plays a very important role in classroom learning. This media will provide meaningful experiences for students (Rosdiana, 2018; Wangge, 2020). Learning with ICT-based media will improve the quality of education effectively by utilizing technology, information and communication (Leriyono et al, 2016). One of the things that must be done is choosing learning media that can support the learning process (Farwati et al., 2021). The use of media assisted by Google Sites can be used for learning. Google Sites is a facility on Google which has several features as a site. This site will be managed in the form of a website-like display that can contain text and learning videos (Sevtia et al., 2022). Apart from that, Google Sites makes it easier to access information because it can contain attached files which are packaged into files that can be accessed via the internet (Arief, 2017; Rosiyana, 2021).

Electronic modules make it easier for students to understand the material according to learning objectives. This module can allow students to learn independently or with the help of a teacher (Muniroh et al., 2023; Permatasari et al., 2023). The use of Google sites can be used in science learning media. In line with this, science learning supports the process of exploring information about science products which can be done by accessing information widely through the use of digital platforms (Ariastika, 2022; Sari & Sutihat, 2022). These Google sites can contain science material and content that supports learning. Science content will be published on a special website on Google Sites so that

students can freely use it (Amarulloh, 2022; Ulum et al., 2019). The use of Google Sites media is also expected to increase literacy in using technology, namely developing the ability to access information in digital technology in science learning (Ernest & Putra M, 2023; Waraga et al., 2023).

**Method**

The type of research carried out is quantitative research. The two class selection technique is based on the cluster random sampling technique. The sample used in this research was grade 8 students at SMPN 6 Yogyakarta. The experimental class consisted of 28 students, while the control class consisted of 30 students. The two classes will be given different treatment. The experimental class will be given science lessons using vibration, wave and sound material with the help of Google Sites. Meanwhile, the control class will be treated with science learning material on vibrations, waves and sound using a flipbook module. The instruments used in this research were 20 multiple choice questions and an ICT literacy questionnaire. Questions and questionnaires will be distributed to two classes after being given treatment via Google Form.

The indicators used in this research are adopted from Eliana et al. (2016) namely access, manage, integrate, evaluate, create and communicate. The question instrument includes 4 access and manage indicator questions, 4 integrate indicator questions, 7 evaluate indicator questions, 3 create indicator questions and 2 communicate indicator questions. Meanwhile, the questionnaire instrument consists of 25 statement items with 4 access indicator statements, 5 manage indicator statements, 3 integrate indicator statements, 4 evaluate indicator statements, 4 create indicator statements and 5 communicate indicator statements. The following is Table 1, a description of ICT literacy indicators.

**Table.1** ICT Literacy Indicators

Indicators	Description
Access	Ability to collect information using digital technology
Manage	Ability to classify information
Integrate	Ability to interpret and handle problems through technology
Evaluate	The ability to assess information obtained from digital technology
Create	Ability to apply information obtained from digital technology
Communication	Ability to communicate results obtained from digital information

This research uses statistical analysis with the help of the SPSS Windows 22.0 application to see the results of differences in treatment between the experimental

class and the control class. The statistical test used is a parametric test, namely an independent sample t test with the following hypothesis:

H0: There is no significant difference in the ICT literacy profile of science learning assisted Google-sites based

H1: There is a significant difference in the ICT literacy profile of science learning assisted by Google-sites based.

The results of the ICT literacy questionnaire analysis were carried out using descriptive analysis referring to Table 2 for ICT literacy categories.

**Table 2.** ICT Literacy Categories

Interval Score	Category
$X > 84$	Very high
$70 < X \leq 84$	High
$57 < X \leq 70$	Medium
$41 < X \leq 56$	Low
$X \leq 41$	Very low

### Result and Discussion

This research aims to determine the profile of junior high school students regarding ICT literacy in science learning with the help of Google-sites. ICT literacy is a concept that describes students taking advantage of technology, information and communication in obtaining digital information in learning. Science learning which is closely related to the search for facts originating from the information obtained will be supported by the existence of ICT literacy (Hatlevik et al., 2018). The science learning process will be effective if it is supported by the use of appropriate learning media. Choosing learning media based on technology, information and communication will support students to search for information and prove its truth, one of which is by using Google sites (Ernest & Putra M, 2023; Utami, et al., 2023).

The following is a Google Sites view of material on vibrations, waves and sounds for 8th grade science learning on Figure 1.



**Figure 1.** Google-sites view of material on vibrations, wave and sounds

Google sites already contain concept maps, learning outcomes, materials packaged via hyperlinks, learning videos, virtual laboratories and final assessments containing ICT literacy questions and questionnaires for students.

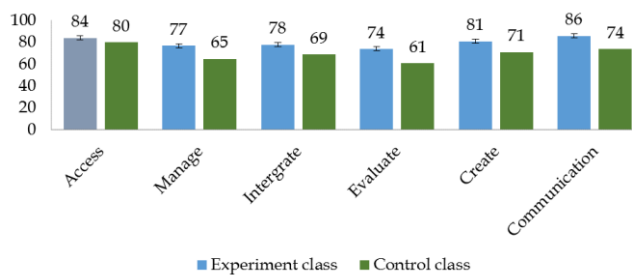
Based on the results of the analysis of ICT literacy questions, the prerequisite tests were obtained, namely the normality test and homogeneity test. For the normality test, it is known that the Sig value.  $0.176 > 0.05$  so the population is normal, while for the homogeneity test it is known that the Sig.  $0.361 > 0.05$  so that the population variance is homogeneous. Next, the data was analyzed using the independent t test. The following is Table 3 of the results of the independent sample t test analysis.

**Table 3.** The Result of Independent t Test

Output	$t_{count}$	$t_{table}$	Sig. (2-tailed)
Equal Variance Assumed	3,167	1,997	0,039

In Table 3, it can be seen that H0 is rejected and H1 is accepted, shown by a significance level value of 0.039 ( $Sig < \alpha$ ). Thus, there are significant differences in student profiles regarding ICT literacy in science learning assisted by Google-Sites. Based on this, it indicates that there is an influence of the use of Google-sites in science learning on students' ICT literacy. This influence can occur as a result of science learning assisted by Google-sites, which contains elements that support 6 indicators of ICT literacy. Based on these results, it can be seen that the use of Google Sites in science learning can facilitate students to develop ICT literacy in the aspects of access, manage, integrate, evaluate, create and communicate. The difference in the use of Google-sites on students' ICT literacy is supported by the results of the ICT literacy questionnaire analysis.

The following is data from the results of the ICT literacy questionnaire for junior high school students which is shown in Figure 2.



**Figure 2.** The result ICT literacy questionnaire

Based on Figure 2, it can be seen that in the experimental class each indicator has a higher average questionnaire score than in the control class. For the access indicator, the experimental class and control class

received a high category. ICT literacy can support students in accessing information obtained with the help of digital aspects. Students will access more available hyperlinks to explore knowledge (Hatlevik et al., 2018). This can be seen from the access indicator for both classes which tends to be high, due to the use of hyperlinks on the Google-site for the experimental class and flipbook access for the control class.

The two management indicators, students have the ability to process the information obtained correctly and accurately. ICT literacy will grow students' ability to classify existing schemes into new knowledge (Eliana et al., 2016; Kim & Lee, 2013; Wilson et al., 2015). Using the website on the Google-site will make it easier for students to manage it because it is integrated with links (Saputra et al., 2022). Google-sites will make science learning more effective in increasing ICT literacy compared to just using learning media in the form of flipbooks.

The third indicator is integrate, the ability of students to interpret information and integrate it into new knowledge obtained. In science learning, the interpretation of this information is very important in order to find information that is a fact or concept that will produce the science product itself (Hatlevik et al., 2018). Students will be required to analyze the findings they get from content on Google sites so that students independently find the information.

The fourth evaluation indicator, ICT literacy itself combines technology use skills, cognitive abilities and the ability to recognize and solve problems related to ICT (Baek, 2008; Kereluik et al., 2013). This will stimulate students to assess information from the digital technology used. Students already realize that being selective in choosing the information they obtain is very important. This is due to the ability to evaluate information and understand the environment in which the information is produced and disseminated (De Paor & Heravi, 2020; Indahsari et al., 2023; Rahmatulloh & Napis, 2023). So, students can determine whether the information is valid or not.

Lastly, the create and communicate indicator, the use of the Google Site web will encourage students to be more creative and be able to take advantage of the features on the Google Site to share with each other. The results of using features to search for information will be used by students to apply them in everyday life (Saputra et al., 2022; Utami, et al., 2023). The use of ICT-based learning media will develop effective communication skills and a responsible attitude in using this media (Baek, 2008; Yazon et al., 2019).

The use of Google-sites in science learning can have an effect on ICT literacy. Students will utilize the features contained in Google-sites to explore knowledge. Students must be improving the quality of education is

one of the basic efforts that can be done. Education in era digital intergrates knowledge, skills and attitudes as well as of information and communication technology (ICT) (Rehman et al., 2023). Apart from that, it will be easier for students to carry out assignments because teachers can provide them directly on Google sites with the help of hyperlinks (Ernest & Putra M, 2023; Pratomo et al., 2022; Sari et al., 2022). Therefore, ICT literacy of junior high school students in science learning can be supported by using learning media, one of which is with the help of Google-sites.

## Conclusion

Science learning assisted by Google Sites learning media can have an impact on the ICT literacy of junior high school students. There is a significant difference between the experimental class and the control class in the use of Google-sites in science learning regarding ICT literacy.

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## Author Contributions

IZE contributed as conceptualized of ideas, designed research methods, collected-analyzed data, development for media google-sites and as the main author of the article. S contributed as lecturers who provided guidance in research and writing this article.

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