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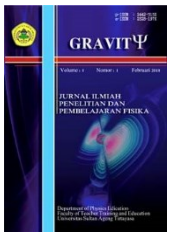

Analysis of information and communication technology literacy capabilities to the high school physics teacher in Merauke

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ABSTRACT

A physics teacher needs information and Communication Technology (ICT) literacy skills in teaching and learning in the classroom. This study aims to analyze the ICT literacy skills of high school physics teachers in Merauke city. This type of research is descriptive quantitative research. Respondents involved in this study were 19 high school physics teachers in Merauke City (Merauke District). The instrument used to collect data was an ICT literacy ability questionnaire developed by researchers totaling 40 statements. The research data were processed using descriptive statistical analysis techniques by determining the percentage of respondents' responses. The analysis showed that the average rate of ICT literacy skills in high school physics teachers was 87%. This means that in general, the ICT literacy skills of high school physics teachers in Merauke City are in the "excellent" category.

Keywords: literacy, ICT, physics teacher

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INTRODUCTION

Current technological developments provide an excellent challenge for education. The development of technology in education is very influential in the learning process (Savila et al., 2018). There are various educational demands which appear to confront this era, including the requirement for teachers and learners to master the technology. The application of technology in education requires a creative and innovative education to take advantage of technology in learning (Sari et al., 2018). Especially for educators, the learning outcomes should be able to integrate literacy into three areas, namely the old literacy, new literacy and scientific literacy (Suwardana, 2017). Related to technology, the most stressed of these areas is the new literacy. The focus of the new literacy is digital literacy, technology literacy, and literacy humans (Suwardana, 2017; Yahya, 2018).

Among the three new focus on literacy, technology literacy in the form of Information and Communication Technology (ICT) into the main capabilities that continuously improved in the field of education. Literacy This is one part of the literacy skills contained in 21st century skills (Taher & Abtaria, 2017). ICT literacy skills in the form of technology is beneficial to improve performance in activities of daily living. Exercise is the analysis of in-

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formation media to communicate and create media (BNSP 2010; Trilling & Fadel 2009). Utilization of Information and Communication Technology (ICT) is undoubtedly going to help educators to deliver effective learning.

One who craves ICT learning is learning physics. Learning physics is learning to understand the nature, the laws of view as well as proving (Linney, 2008). In the study of physics, some of the material is abstract enough that it is difficult to understand. Material conceptual physics that can be visualized by the media and multimedia. Multimedia in question can be text, audio, video, and audio-visual (Wiyono et al., 2012).

There is a lot of material physics that can be visualized by using ICT, including 1) the material can be represented abstract and imaginative (Frydenberg & Andone, 2011); 2) makes it easy to learn the physics of material that is submacroscopic (Wiyono et al., 2012); 3) and can improve critical thinking skills and generic (Hermann et al., 2015). It is the basic demands for physics teachers have excellent ICT literacy skills.

ICT literacy skills are suitable for a physics teacher can maximize learning in the classroom to explain the material is still abstract. If the goal is reached, then the graduates produced a physics teacher graduates who are competent and have high competitiveness. Hence, this study aimed to analyze the extent to which ICT literacy skills high school physics teacher in the town of Merauke. The results of this study will provide a real picture of ICT literacy skills high school physics teachers in the city of Merauke and consideration if required for follow-up in the form of training in the field of ICT.

Some relevant research has also shown the importance of the use of ICT in learning. A study conducted by Rahayu & Mayasari (2018) showed that the physics teacher was less use of ICT for learning and therefore contributes to the low digital literacy skills of students in physics. Similar results are show by Fauzi et al. (2016), which states that there are still many physics teachers who have not been able to use ICT in learning so that student's literacy rate is still lacking.

RESEARCH METHODS

This study is a descriptive quantitative research that aims to describe the results of the analysis of the ICT literacy skills high school physics teacher in the town of Merauke. The population in this study were all Senior High School or SMA/MA/SMK and equal in Merauke, amounting to 25 schools. The sample in this study come 12 SMA/MA/SMK and equally located in the town of Merauke. The respondents involved are all teachers of physics at the 12 SMA/MA/SMK Kota Merauke totaling 19 people. Overall was immediately given a questionnaire respondents ICT literacy abilities in the absence of specific treatment. This is because research purposes only to determine the strength of ICT literacy. The research instrument is an ICT literacy questionnaire developed by the research team based on aspects of the ICT literacy, basics of using a computer/network, electronic mail, word processing, information retrieval, the basics of the worksheet, and integrate various applications of Information Technology. This instrument was developed researcher to 40 item statements.

Table 1 . Interpretation of results percentage

Percentage (%)	Category
0-20	Very less
21-40	Less
41-60	Enough
61-80	Well
81-100	Very good

The scale used in this study is the Likert scale. The data was processed using descriptive statistical analysis techniques to determine the percentage of responses from respondents. The results of the analysis are categorized based on Table 1. Based on the categories were then summed level of ICT literacy skills high school physics teacher in the town of Merauke.

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RESULTS AND DISCUSSION

ICT literacy skills consisted of seven aspects, and seventh aspects of ICT literacy are detailed through indicators which developed into a questionnaire for measuring ICT literacy high school physics teacher in the town of Merauke. The translation of each aspect of ICT literacy are presented in Table 2.

The results of the analysis provide information that the average percentage of ICT literacy skills high school physics teachers by 87%. This means that the general ICT literacy skills high school physics teacher in the town of Merauke, in the category "very good." Meanwhile, compared with the ICT capabilities of students, teachers have a higher capacity, where the percentage of the ability of student teachers of physics only reached 76.4% (Bahri & Waremra, 2018),

ICT literacy skills high school physics teacher in the town of Merauke on each aspect is presented in Figure 1. The information obtained from the analysis of the ICT literacy skills high school physics teacher in the city

Table 2. Indicators of ICT literacy skills

No	Aspect	Indicator
1	Basics of using a computer / network	1) Perform file management: copy, delete, rename, move 2) Perform data management: creative, save, open, close 3) Managing files using folders and drives 4) Using a Graphical User Interface 5) *Log on* and log off to a network
2	Electronic mail	1) Doing send attachments on email 2) It read, respond, and forward e-mail 3) Conduct an open, compile and send email
3	Word processing I	1) Adding the words in the document 2) Spell checking documents 3) The save and print documents 4) Editing text
4	Word processing II	1) Incorporate drawing 2) Inserting frames and objects 3) Insert clip art 4) inserting equation 5) insert page breaks 6) Using the automatic bullets and numbering 7) Using the insert, use and format tables 8) Entering the page and date into a document 9) Using footnotes and endnotes 10) Using headers and footers 11) Changing the spacing of the worksheet 12) Changing the margin of a worksheet
5	Searching information	1) Certain gateways internet mengkases 2) Saving search results 3) seeking information on www web browser 4) Using a browser and Internet navigation 5) Accessing electronic data base 6) Print your search results as a file 7) Finding journals in the library online 8) Finding books in the online catalog
6	Basics worksheet	1) Make the title and the name of the chart / graph 2) Make a chart based on data in a spreadsheet 3) Using the formula to calculate 4) Insert, edit and format the data
7	Integrating the various IT applications	1) Copying images from the web and paste it into a document 2) Copy and paste the web document into a document 3) Insert the file in another file 4) Men-switch range of applications

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of Merauke highest on issues of electronic mail with a percentage of 91%, which is in the category "very good." This means that the average high school physics teacher in the town of Merauke has been excellent in the use of electronic mail in assisting job. Lowest ICT literacy skills in aspects of integrating various IT applications with a percentage of 84%. Although the elements of integrating IT applications said the most depressed, this aspect is still in the category of "very good."

Percentage indicators on aspects of the basics of using a computer/network (Aspect 1) are presented in Figure 2. Information obtained the highest percentage in the indicator's ability to use Graphical User Interface (Indicator 4) and log on and log off to a network (Indicator 5) namely 95%. While the lowest percentage in the indicator to perform data management: creative, save, open, close (Indicator 2). This means that high school physics teachers are still not fully understood on how to create, save, open and close files on the computer. Even so, the overall percentage of ICT literacy skills high school physics teachers on aspects of the

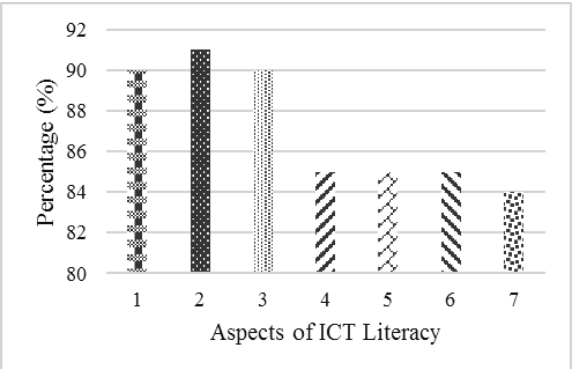

Figure 1. Percentage aspects of the literacy skills of Information Technology and Communication

basics of using a computer/network are in the category of "very good".

Analysis of indicators on aspects of electronic mail (Aspect 2) provides information that all three signs on such elements have the same average percentage of which amounted to 91% who are in the category of "very good." This means that the majority of high school physics teacher can send attachments to email; read, respond, and forward e-mail; and open, compile and send the email. The percentage of indicators on aspects of electronic mail is presented in Figure 3.

Aspects that further analysis is word processing I (Aspect 3) consisting of four indicators (see table 1). The results of the analysis are presented in Figure 4. The information ob-

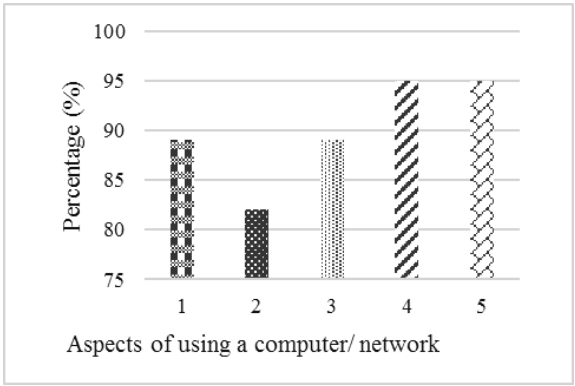

Figure 2. Percentage of indicators on aspects

tained from Figure 4 that the highest percentage in the indicator spell-checking documents (Indicator 2) by 95% and the lowest in text editing indicator (indicator 4) by 82%. Even so, they still are in the category of "very good. Thus, it can be concluded that the overall indicator of aspects of word processing I is controlled by the majority of high school physics teachers in the town of Merauke.

The results of the analysis of aspects of word processing II (Aspect 4) is presented in

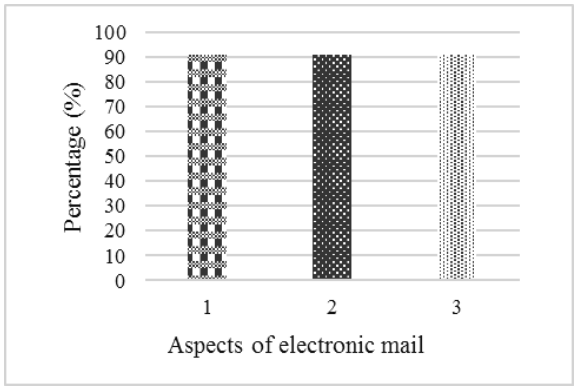

Figure 3. Percentage of indicators on aspects of electronic mail

Figure 5. This aspect is composed of 12 indicators. Information obtained from the analysis is the highest percentage in the frame and insert the indicator object (Indicator 2) and enter

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the page and the date on the document (Indicator 7) by 93% who are in the category of "very good". While the lowest percentage indicator to enter the equation (Indicator 4) by 75%, which is in the category of "good." Besides, other indicators are in the category of "good," such as using the header and footer (Indicator 10) with a percentage of 77%, replace the space of the worksheet (Indicator 11)

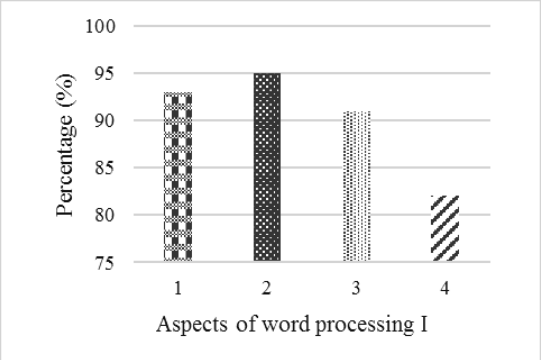

Figure 4. Percentage of indicators on aspects of word processing I

and change the margins of a worksheet (indicator 12) where both the percentage of 80%. This means there are still some teachers who have not been able to enter equations, use headers and footers, replace spaces, and change margins in Microsoft word.

The following aspects were analyzed is information retrieval (Aspect 5). The percentage of each of the indicators on this aspect is presented in Figure 6. Overall, the percentage of each indicator in the category "very good". The highest percentage indicator to save search results (Indicator 2) by 89%, while there are three indicators that have the lowest percentage of 82%. All three indicators among

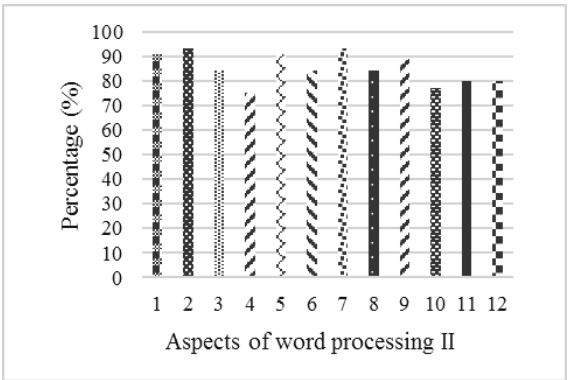

Figure 5. Percentage of indicators on aspects of word processing II

other things, accessing electronic databases (Indicator 5), print your search results as a file (Indicator 6) and search for books in the online catalog (Indicator 8).

The results of analysis of both the fundamentals of a worksheet (Aspect 6) show that there are three indicators that are in the category of "very good", while the indicators are in the category of "good." The lowest indicators in this aspect are to enter, edit and format the data (Indicator 4) the percentage obtained by 80%. This means that there are still 20% high school physics teacher in the town of Merauke is lacking in the insert, edit and format the data. Diagram percentage analysis results on the basics aspects of worksheets presented in Figure 7.

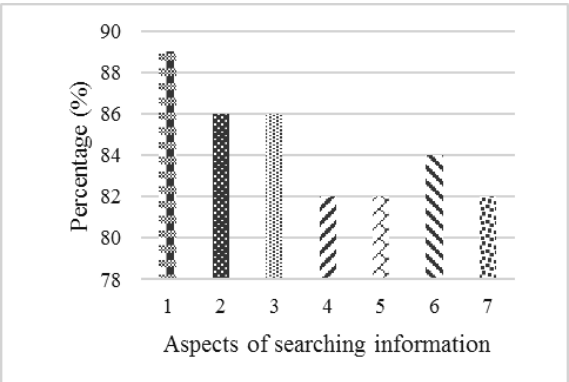

Figure 6. Percentage of indicators on aspects of information search

Analysis of indicators on aspects of integrating various IT applications (Aspect 7) is presented in Figure 8. The information obtained that there are three indicators were categorized as "very good" and one indicator categorized as "good". The percentage of good indicators that category by 80% with the indicator is to copy the image from the web and paste it into a document (Indicator 1). This means there is still a 20% high school physics teacher who has not been able to copy the images from the web.

In general, ICT literacy skills high school physics teacher in the town of Merauke has been very good. This can be seen from the average percentage of each aspect of the ICT literacy skills which are in the category of "very good". Despite this, there are some indicators that are still in the category of "good".

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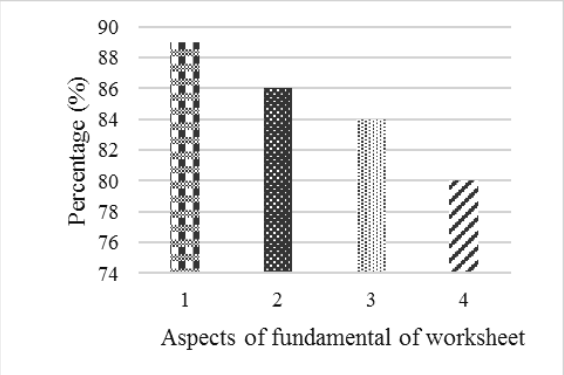

Figure 7. Percentage of indicators on aspects of the fundamentals of a worksheet

Indicators in question namely: 1) enter the equation, 2) using the header and footer, 3) replace the space of the worksheet, and 4) change the margins of a worksheet, 5) enter,

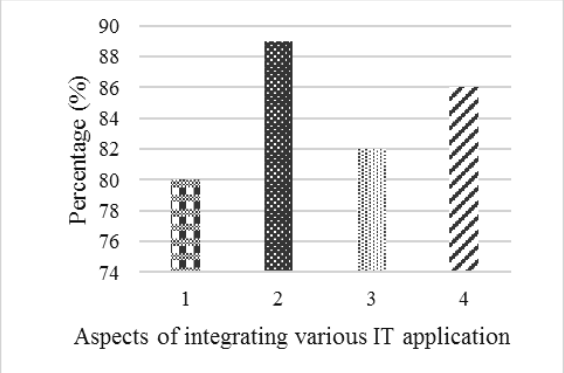

Figure 8. Percentage of indicators on aspects of integrating various IT applications

edit, and format the data, and 6) copy an image from the web and paste it into another document. Thus, the need for efforts to improve the literacy skills of ICT in these indicators. (Frydenberg & Andone, 2011)And makes it easy to learn the physics of material that is submacroscopic (Wiyono et al., 2012), Therefore, teachers are expected to have good ICT literacy skills on each indicator to support learning physics in schools(Rafianti et al., 2018),

CONCLUSION

The results of the analysis provide information that the average percentage of ICT literacy skills high school physics teacher in the town of Merauke by 87%. This means that the general ICT literacy skills high school physics teacher in the town of Merauke in the category "very good". However, there are some indicators of ICT literacy skills that need attention and increased so that the ICT literacy skills high school physics teacher in the town of Merauke be better.

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REFERENCES

Bahri, S., & Waremra, R. S. (2018). *Skills for The Use of Information and Communication Technology Prospective Physics Teachers in Facing The Learning of The Industrial Revolution Era 4.0*. International Journal of Mechanical Engineering and Technology. *9*(11), 28–36.

BNSP. (2010). *Paradigma Pendidika Nasional Abad XXI*.

Fauzi, A, dkk. (2016). *Potret Penggunaan TIK Oleh Guru Sekolah Menengah Atas untuk Menanamkan Keahlian Literasi Siswa dalm Mendukung Pembelajaran Fisika*. Jurnal Profesi Pendidik. ISSN 2442- 6350

Frydenberg, M., & Andone, D. (2011). Learning for 21st Century Skills. *International Conference on Information Society (i-Society 2011)*, 314–138.

Hermann, M., Pentek, T., & Otto, B. (2015). *Design Principles for Industry 4.0 Scenarios: A Literature Review*. *1*(1), 1–16.

Linney. (2008). *Physics, Astronomy and Astrophysics*. Gloucester. Quality Assurance Agency for Higher Education.

Rafianti, I., Setiani, Y., & Novaliyosi. (2018). Profil Kemampuan Literasi Kuantitatif Calon Guru Matematika. *JPPM*, *11*(1).

Rahayu, T & Mayasari, T. (2018). Profil kemampuan awal literasi digital dalam pembelajaran fisika siswa SMK Kota Madiun. Jurnal Seminar Nasional Quantum

Sari, D. K., Supahar, & Ralmugiz, U. (2018). The Influence of Android-Based Isomorphic Physics (FORFIS) Application on Analogical Transfer and Self-Diagnosis Skill of Students at SMA NEgeri 3 Kupang. *Jurnal Pendidikan IPA Indone-*

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sia, *7*(2), 154–161.

Savila, F., Astra, I. M., & Muliyati, D. (2018). Pengembangan Komik Biografi Sir Isaac Newton Sebagai Media Pembelajaran Fisika Menggunakan Aplikasi Paint Tool SAI. *Gravity : Jurnal Ilmiah Penelitian Dan Pembelajaran Fisika*, *4*(2), 36–45. https://doi.org/10.30870/gravity.v4i2.4031

Suwardana, H. (2017). *Revolusi Industri 4.0 Berbasis Revolusi Mental*. Jurnal Ilmiah Teknik dan Manajemen Industri. Vol 1, No 2.

Taher, M., & Abtaria, Y. (2017). Efektifitas Pembelajaran Creative Problem Solving Berbasis Eksprimen Dalam Pembelajaran Fisika Untuk Melatihkan Literasi Teknologi Siswa. *Gravity : Jurnal Ilmiah Penelitian Dan Pembelajaran Fisika*, *3* (2), 148–157. https://doi.org/10.30870/gravity.v3i2.2598

Trilling, B., & Fadel, C. (2009). *21st Century Skills: Learning for Life in Our Times*. San Fransisco. Jossey-Bass Publisher.

Wiyono, K., Setiawan, A., & Paulus, C. T. (2012). Model Multimedia Interaktif Berbasis Gaya Belajar Untuk Meningkatkan Penguasaan Konsep Pendahuluan Fisika Zat Padat. *Indonesian Physics Education Journal*, *8*(1).

Yahya, M. (2018). Era Industri 4.0: Tantangan dan Peluang Perkembangan Pendidikan Kejuruan Indonesia. *Sidang Terbuka Luar Biasa Senat Universitas Negeri Makassar*.

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