Implications and Impact of Digital Literacy on Higher Education: Systematic Literature Review

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ABSTRACT

Digital literacy is the ability to interpret and use all information/data widely obtained with digital assistance. Digital literacy plays an important role in the industrial revolution 4.0 era because in this era there is an integration of advanced digital technology in all aspects of life including education. The purpose of this study is to investigate the application and impact of digital literacy in higher education. The method in this research is a systematic literature review with use PRISMA method. In this study, a process of identification, synthesis and analysis of scientific articles relevant to the impact of digital literacy on higher education was carried out. Digital literacy has a significant impact on higher education, shaping the way students and educators interact with information and technology. It is important for higher education institutions to integrate digital literacy in the curriculum, as well as address the challenges that arise, to ensure that students are prepared for future challenges in an increasingly digitized world.

| KEYWORDS | digital literacy, higher education, systematic literature review. |

INTRODUCTION

Digital literacy is one of the indicators in education and culture to create a critical and creative way of thinking for learners. Digital literacy triggers learners from passive to active recipients of information. Digital literacy is the ability to understand and use a wide and free range of information obtained through digital assistance (Silalahi et al., 2022). (Silalahi et al., 2022).

Digital literacy is essential in the Age of Industrial Revolution 4.0 due to major shifts in the way industries and societies operate. The era of the Industrial Revolution 4.0 is characterized by the integration of advanced digital technologies

in almost all aspects of life and business, including manufacturing, services, communications, and education. (Dewayani & Retnaningdyah, 2017). Digital literacy skills will equip students to thrive in a digital society, giving students the opportunity to actively engage in academics and bridge them to critical analysis. The integration of digital learning in the education sector can expand access to education with significant contributions of teachers as instructors. Digital savvy teachers are expected to make learning activities more meaningful, effective and productive. (Silalahi et al., 2022).

In facing the era of the industrial revolution 4.0, a new literacy is needed because the old literacy used today is used as capital to live social life. Literacy also takes a very important role and must be observed in individuals because this literacy is related to individual skills in communication, critical thinking, collaboration, creativity and innovation. This is a support that should be owned by every human being in living a more complex life in the future. (Siahaan, 2018)

Higher education refers to the level of education that is above secondary education. It includes various forms of educational institutions after secondary school, such as colleges, universities, polytechnics and other higher education institutions. Higher education usually provides a higher, more specific and more in-depth level of education in a particular field. Higher education is an important foundation in shaping individuals to face the demands of modern times. In an era where information and communication technology has become rampant, digital literacy has become an inevitable critical skill.

This research aims to explore the impact and implications of digital literacy in higher education. Digital literacy is expected to overcome challenges in improving the quality of learning and preparing students to enter the increasingly digitalized world of work. By detailing the implications and impacts, we can understand how important the integration of digital literacy is in the context of higher education to form a generation that is competent and ready to face the ever-evolving global challenges.

RESEARCH METHOD

This study used the PRISMA methodology (Preferred Reporting Items for Systematic reviews and Meta-Analyses) . The stages of the literature review were as follows: 1) formulation of research questions, 2) Specification of article inclusion and exclusion criteria, 3) formulating a literature search plan, 4) Search for articles in the selected database, 5) Evaluation of the quality of the retrieved articles according to the predetermined criteria, 6) Systematization of information and 7) Interpretation and presentation of results. To complete this study, researchers collected journal articles using the keywords of the implications and role of digital literacy in higher education. The articles collected were articles published in the time span of 2019 to 2023. Search results from Google Scholar, Scopus, Science Direct and Eric found a total of 1026 related articles and selected into 12 articles.
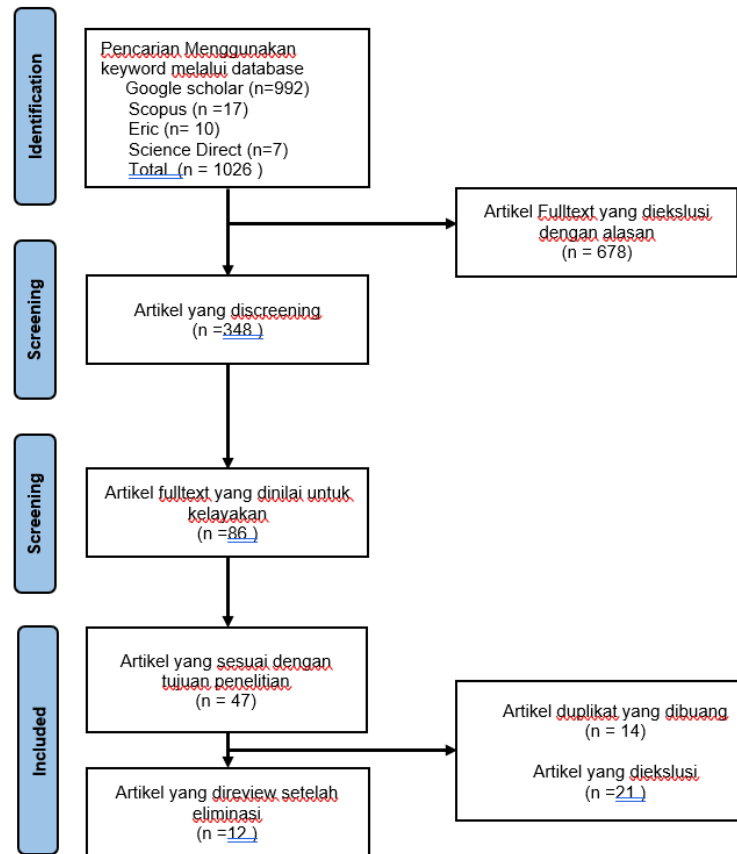
Figure 1: Prism method

Formulation of research questions, based on the following PICOC:

1. Population (P): Students and lecturers in higher education institutions
2. Intervention (I): Implications and impact of digital literacy in higher education
3. Comparison(C): Comparison between the group that participated in the digital literacy program and the control group that did not participate in the program.
4. Outcome (O): Improved student digital literacy skills, positive impact on learning quality and implications for teaching and learning.
5. Context (C): Higher education institution at national or regional level, digital learning environment, including available technology resources and infrastructure.

Table 1. Article search protocol

					Eric	Google scholar	Science Direct	Scopus	Total (1)
A.	Pertanyaan penelitian								
		A.1	Bagaimana implikasi literasi digital pada pendidikan tinggi						
		A.2	Bagaimana dampak literasi digital pada pendidikan tinggi						
B	Basis Data		Google scholar, Eric, Science Direct, Scopus						
C	Kriteria Pencarian								
		C.1	Bahasa	Bahasa Inggris					
		C.2	Bidang Keilmuan	Pendidikan					
		C.3	Jurnal	Sinta 1, sinta 2 dan scopus					
		C.4	Bidang pencarian	Judul, Abstrak dan kata kunci					
		C.5	Tanggal Publikasi	2019-2023					
		C.6	Tanggal Pencarian	5 November 2023					
D	Istilah Pencarian								
			Kata Kunci		Eric	Google scholar	Science Direct	Scopus	Total (1)
		D.1	"Implications and Impact of Digital Literacy" AND "Higher Education"		10	992	7	17	1026
			Setelah penghapusan catatan duplikat						
E	Kriteria Inklusi								
		E.1	Artikel						
		E.2	Relevan dengan topik						
		E.3	Fokus pada pendidikan Tinggi						
F	Kriteria eklusi								
		F.1	Prosiding konferensi, Buku						
		F.2	Tidak relevan dengan topik						
		F.3	TK,SD, SMP dan SMA						
G	Hasil Pencarian								
		G.1	Dari pencarian kata kunci	1026					
		G.2	Setelah tinjauan abstrak	167					
		G.3	Setelah tinjauan artikel	12					

The article search process began on November 5, 2023. The articles collected are English-language articles focused on higher education. The articles collected consist of sinta 1, sinta 2 and scopus articles. The article search focused on the title, abstract and keywords. The keywords used in the article search were "Implication and Impact of Digital Literacy" AND "Higher Education". The data bases in this research are Google Scholar, Eric, Scopus and Science Direct. The Google Scholar data base obtained 992 articles, Eric data base obtained 10 articles, Scopus as many as 17 articles and Science Direct as many as 7 articles. The total number of articles found is 1026 articles.

The selection of articles is based on inclusion and exclusion criteria. Inclusion criteria are criteria that are used as a benchmark in selecting articles that will be sampled in research. The inclusion criteria in this study are 1) Article. 2) Relevant to the topic, 3) Focus on higher education. 4) Range of years 2019-2023. Exclusion criteria are criteria used in removing articles that are not relevant to the research objectives. The exclusion criteria in this study are 1) Conference proceedings and books, 2) Not relevant to the topic, 3) research focus on kindergarten, elementary, junior high and high school students, 4) 2018 and earlier.

RESULTS AND DISCUSSION

The selection of articles consists of two stages, namely abstract review selection and full manuscript screening selection. Screening is based on

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predetermined inclusion and exclusion criteria. At the initial stage of selection, the total number of articles searched was 1026 articles and after the selection stage, it was reduced to 12 articles that would be analyzed in depth, which can be seen in the following table:

Table 2. Article Analysis

No.	Author	Title	Year	Country	Journal Name	Rating
1	Ahmet Kamil Kabakus, *et all*	The effect of digital literacy on technology acceptance: An evaluation on administrative staff in higher education	2023	Turkey	Journal of Information Science	Q2
2.	Erika E. Smith and Hannah Storrs	Digital literacies, social media, and undergraduate learning: what do students think they need to know?	2023	Canada	International Journal of Educational Technology in Higher Education	Q1
2	Nasreen Khan, *et all*	Connecting digital literacy in higher education to the 21st century workforce	2022	Malaysia	Connecting digital literacy in higher education to the 21st century workforce	Q3
3	Ani Widayati	Industrial Revolution Era 4.0: Digital Literacy of Accounting Education Students	2022	Indonesia	Education Dynamics	Q2
5	Thi Lan Huong LE, *et all*	Impact of digital Literacy on intention to use technology for online distribution of higher education in Vietnam	2022	Vietnam	Journal of Distribution Science	Q4
6	Encik Savira Isnah et.all	The Effect of Digital Literacy on Language Ability in Higher	2022	Indonesia	Journal of Higher Education Theory and Practice	Q4

		Education: Experience From a Developing Country				
7	Aji Budi Rinekso, *et all*	Digital Literacy Practices in Tertiary Education: A Case of EFL Postgraduate Students	2021	Indonesia	Studies in English Language and Education	Q3
8	Angélica Reis Monteiro	Digital literacies in higher education: skills, uses, opportunities and obstacles to digital transformation	2021	Portugal	Revista de Educación a Distancia	Q3
9	Chaterina Puteri Doni	Challenges of Digital Literacy Education in Pandemic Period	2021	Indonesia	Journal of Education Review Provision	Q1
10	Shahrokh Nikou & Milla Aavakare	An assessment of the interplay between literacy and digital technology in higher education	2021	Finland	Education and Information Technologies	Q1
11	Rahmat Rizal, *et all*	The Digital Literacy of The First Semester Students in Physics Education	2020	Indonesia	Journal of Physics Education, University of Muhammadiyah Makassar	Q2
12	Claire McGuinness & Crystal Fulton	Digital literacy in higher education: a case study of student engagement with e-tutorials using blended learning	2019	Ireland	Journal of Information Technology Education: Innovations in Practice	Q3

Descriptive Analysis

Based on the review of 12 articles, it is known that there are 2 articles published in 2023, 4 articles in 2022, 4 articles in 2021, 1 article in 2020, and 1 article in 2019. The distribution of article publication years can be seen in the following graph.
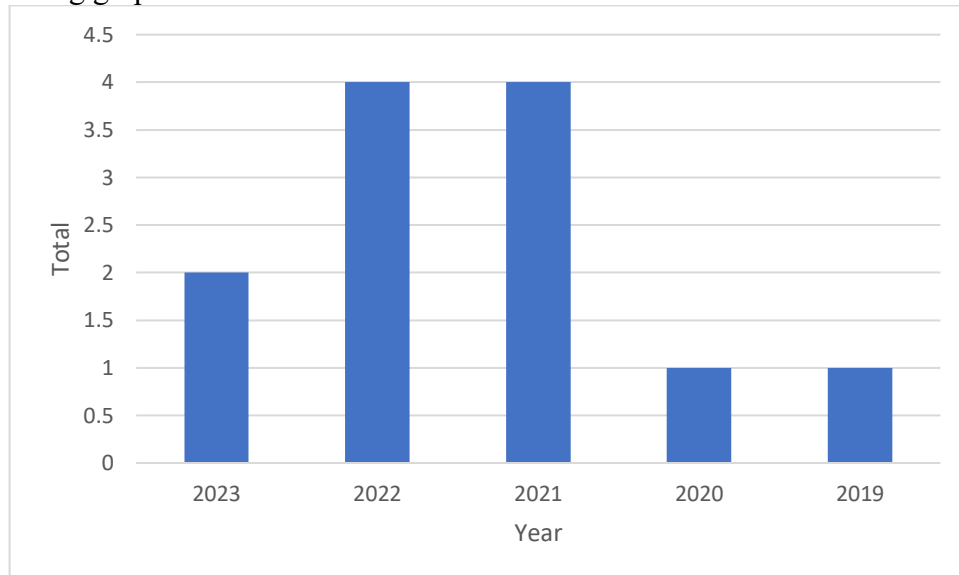

Figure 1. Year distribution of articles

This study conducted a literature review of selected articles to examine the implications and impact of digital literacy in higher education. Based on the search results, 12 articles were obtained from 12 different journals. The articles reviewed were written by authors from 8 countries, namely Turkey (1 article), Malaysia (1 article), Indonesia (5 articles), Vietnam (1 article), Portugal (1 article), Ireland (1 article), Pakistan (1 article) and Finland (1 article). The country distribution of article authors can be seen in the following graph.
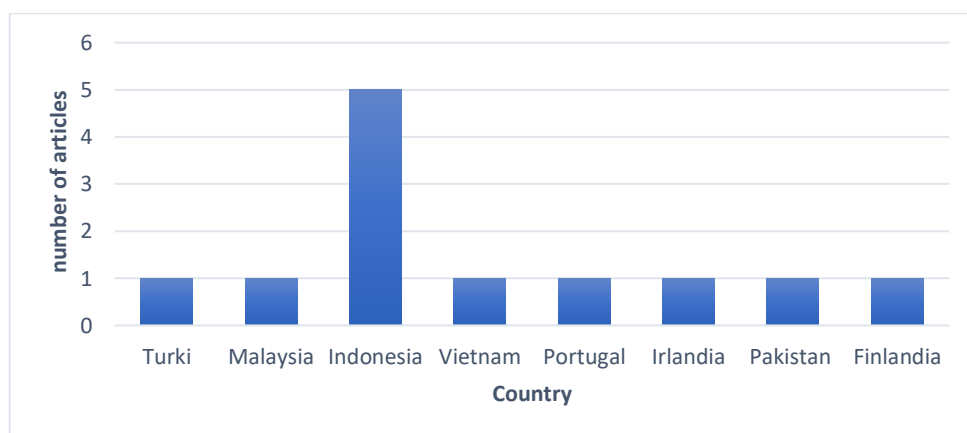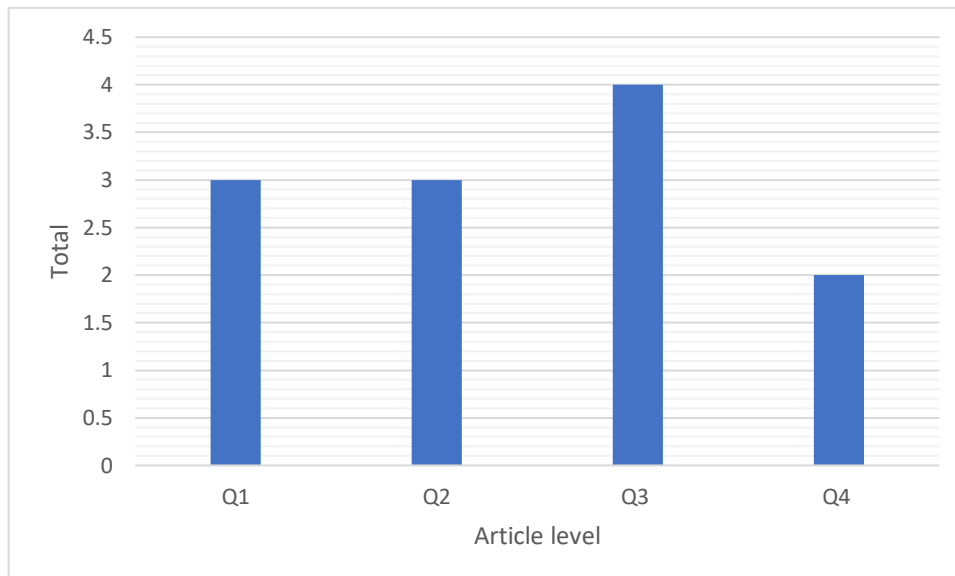

Country of Article Author

Category Analysis

The articles analyzed consist of various levels, namely 3 articles that have Q1

level, 3 articles that have Q2 level, 4 articles that have Q3 level, 2 articles that have Q4 level. The levels of the articles can be seen in the following diagram.

Figure 3. Article Tiers

Table 3. Overview of the Impact and Implications of Digital Literacy

No.	Author	Implications	Impact
1.	Ahmet Kamil Kabakus, *et all*	Use of digital technology in administrative activities	The use of digital technology has an effect on improving performance by administrative staff working in higher education.
2.	Erika E. Smith and Hannah Storrs	The use of social media and digital literacy in higher education learning	There is a gap between the importance of digital literacy for students and the lack of provision on these topics in undergraduate education.
3.	Nasreen Khan, *et all*	Implementation of virtual learning in the learning process	Digital literacy improves academic performance and employability.
4.	Ani Widayati	Changes in digital technology and its contribution to the field of education and to improving digital literacy skills	Improve the digital literacy skills of Accounting students in terms of selecting, responding to, and evaluating information.
5.	Thi Lan Huong LE, *et all*	Understand the factors that influence the use of digital technology by university students, so as to design and implement appropriate strategies to improve digital literacy and technology acceptance among university students.	Digital literacy has a positive and significant influence on technology use for higher education online learning in Vietnam.
6.	Encik Savira Isnah et.all	Digital literacy intervention	Digital literacy has a positive impact on students' English skills,

			especially in reading, writing and speaking.
7.	Aji Budi Rinekso, *et all*	The use of digital literacy by EFL (English as a Foreign Language) graduate students and discussing the types of digital tools used by students and the purposes for which they are used.	The use of digital tools for academic/research and general purposes can have a positive impact
8.	Angélica Reis Monteiro	Implementing digital literacy for university students during the COVID-19 pandemic with online learning.	Students have a fairly good ability to search and edit digital data, students also use digital technology more for institutional and peer-to-peer communication.
9.	Chaterina Puteri Doni	Digital literacy which involves the appropriate use of digital technology and information and involves critical, creative and collaborative thinking skills in a digital context.	Digital literacy can help implement effective, seamless online learning during the Covid-19 pandemic
10.	Shahrokh Nikou & Milla Aavakare	Use of information literacy and digital literacy as the basic skills needed to use digital technology effectively and efficiently.	Information literacy plays a role in shaping intrinsic motivation, while digital literacy plays more of a role in shaping extrinsic motivation.
11.	Rahmat Rizal, *et all*	Integrating digital literacy with other literacies, such as science literacy, numeracy literacy, media literacy and information literacy, to form a holistic and comprehensive 21st century literacy.	Digital literacy can improve the quality of physics learning, both online and offline, by utilizing various relevant, interesting, and interactive digital sources, media, and applications. Digital literacy can also help students to develop creativity, collaboration and communication in physics learning.
12.	Claire McGuinness & Crystal Fulton	Using a series of interactive e-tutorials aimed at improving students' digital literacy	E-tutorials are well received by students and are useful in reinforcing classroom learning, allowing students to repeat concepts and materials taught in face-to-face classes, at their own pace and time.

Content Analysis

Based on table (3) above, we can see the various implications and impacts of the use of digital literacy by students, lecturers and staff in higher education. The article written by (Kabakus et al., 2023) states that the implications of digital literacy are in the use of digital technology in administrative activities and the impact of using digital technology has an effect on improving performance by administrative staff working in higher education. The article written by (Smith & Storrs, 2023)states that the implications of digital literacy are reflected in the use of social media and digital literacy in higher education learning and the impact of the

gap between the importance of digital literacy for students and the lack of provision of materials on these topics in undergraduate education.

The article written by (Khan et al., 2022) the implications of digital literacy through virtual learning in the learning process and the impact of using digital literacy to improve academic performance and employability. Article written by (Widayati et al., 2022) the implication of digital literacy is that there are changes in digital technology and its contribution to the field of education and its impact can improve the digital literacy skills of Accounting students in terms of selecting, responding to, and evaluating information. Article written by (LE et al., 2022) contains the implications of digital literacy with the factors that influence the use of digital technology by students, so that they can design and implement appropriate strategies to improve digital literacy and technology acceptance among students and digital literacy has a positive and significant influence on the use of technology for online learning in higher education in Vietnam.

Article written by (Isnah et al., 2022)describes a digital literacy intervention that has a positive impact on students' English language skills, especially in the aspects of reading, writing, and speaking. The article written by (Rinekso et al., 2021) contains the implications of digital literacy by EFL (English as a Foreign Language) postgraduate students and discusses the types of digital tools used by students and the purpose of their use and the positive impact of using digital tools for reading, writing, and speaking. and has a positive impact on the use of digital tools for academic/research and general purposes. The article written by (Monteiro & Leite, 2021) explains the implications of implementing digital literacy for students in higher education during the COVID-19 pandemic with online learning. The impact is that students have a fairly good ability to search and edit digital data, students also use digital technology more for institutional and peer-to-peer communication.

Article written by (Doni et al., 2021) states that the implications of digital literacy involve the appropriate use of digital technology and information and improve the ability to think critically, creatively, and collaboratively in a digital context and have an impact in assisting the implementation of effective, smooth online learning during the Covid-19 pandemic. Article written by (Nikou & Aavakare, 2021)explains the implications of information literacy and digital literacy as basic skills needed to use digital technology effectively and efficiently and the impact it can have on increasing intrinsic and extrinsic motivation.

Article written by (Rizal et al., 2020) explains the implications of integrating digital literacy with other literacies, such as science literacy, numeracy literacy, media literacy, and information literacy, to form a holistic and comprehensive 21st century literacy which has the impact that digital literacy can improve the quality of physics learning, both online and offline, by utilizing various relevant, interesting, and interactive digital sources, media, and applications. Digital literacy can also help students to develop creativity, collaboration, and communication in physics learning. An article written by (McGuinness & Fulton, 2019) describes the implications of using a series of interactive e-tutorials aimed at improving students' digital literacy and the impact that e-tutorials are well received by students and

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useful in reinforcing classroom learning, allowing students to repeat concepts and materials taught in face-to-face classes, at their own pace and time.

Based on the analysis of the 12 articles above, there are various implications and impacts of digital literacy on higher education. This means that digital literacy is an element that must exist in higher education because it can have a positive influence on various aspects of higher education. This is in line with the opinion that states that (Antoro, 2017) Digital literacy is very important in modern society because almost all aspects of our lives have been digitized. People who have good digital literacy are more likely to succeed in education, work, and participate effectively in a society that is increasingly connected through technology.

Digital literacy has a new orientation in the implementation of higher education. In order for the world of education to continue to have high relevance in the era of the industrial revolution 4.0 or the era of disruption, educators (teachers and lecturers) in the learning process need to integrate the learning outcomes of three fields simultaneously and integrated, namely the achievements of old literacy, new literacy, and scientific literacy. (Wibawa, 2022). Digital technology brings various benefits to develop teachers' creativity, learning materials, and motivation. This encourages them to improve their knowledge and skills in digital technology. (Liza & Andriyanti, 2020)

CONCLUSION

Digital literacy plays a crucial role in changing the paradigm and methods of learning in higher education institutions. The implementation of digital literacy not only affects the way students and educators interact with technology, but also shapes the mindset, skills and attitudes that are essential in facing the digital era. Digital and media literacy has important implications in higher education, both in meeting the challenges and in developing the skills and competencies needed for careers and life in the digitalization era.

REFERENCES

Antoro, B. (2017). Gerakan literasi sekolah dari pucuk hingga akar : sebuah refleksi (1st ed.). Direktorat Jenderal Pendidikan Dasar dan Menengah Kementrian pendidikan dan Kebudayaan.

Dewayani, S., & Retnaningdyah, P. (2017). Literasi Sebagai Praktik Sosial (anwar Holid, Ed.; 1st ed.). PT Remaja Rosdakarya.

Doni, C. P., Husain, D., Saleh, S. R., Pakaya, N. A., Tjalau, C. A., & Arsyad, B. (2021). Challenges of Digital Literacy Education in Pandemic Period. Journal of Education Review Provision, 1(1).

Isnah, E. S., Suyatno, & Subandiyah, H. (2022). The Effect of Digital Literacy on Language Ability in Higher Education: Experience From a Developing Country. Journal of Higher Education Theory and Practice, 22(11), 215.

Kabakus, A. K., Bahcekapili, E., & Ayaz, A. (2023). The effect of digital literacy on technology acceptance: An evaluation on administrative staff in higher

education. Journal of Information Science. https://doi.org/10.1177/01655515231160028

Khan, N., Sarwar, A., Chen, T. B., & Khan, S. (2022). Connecting digital literacy in higher education to the 21st century workforce. Knowledge Management and E-Learning, 14(1), 46–61. https://doi.org/10.34105/j.kmel.2022.14.004

LE, T. L. H., HOANG, V. H., HOANG, M. D. M., NGUYEN, H. P., & BUI, X. B. (2022). Impact of Digital Literacy on Intention to Use Technology For Online Distribution of Higher Education in Vietnam: A study of Covid 19 Context. Journal of Distribution Science, 20(6), 75.

Liza, K., & Andriyanti, E. (2020). Digital literacy scale of English pre-service teachers and their perceived readiness toward the application of digital technologies. Journal of Education and Learning (EduLearn), 14(1), 74–79. https://doi.org/10.11591/edulearn.v14i1.13925

McGuinness, C., & Fulton, C. (2019). Digital literacy in higher education: A case study of student engagement with e-tutorials using blended learning. Journal of Information Technology Education: Innovations in Practice, 18, 1–28. https://doi.org/10.28945/4190

Monteiro, A. R., & Leite, C. (2021). Digital literacies in higher education: Skills, uses, opportunities and obstacles to digital transformation. Revista de Educación a Distancia, 21(65). https://doi.org/10.6018/RED.438721

Nikou, S., & Aavakare, M. (2021). An assessment of the interplay between literacy and digital Technology in Higher Education. Education and Information Technologies, 26(4), 3893–3915. https://doi.org/10.1007/s10639-021-10451-0

Rinekso, A. B., Rodliyah, R. S., & Pertiwi, I. (2021). Digital literacy practices in tertiary education: A case of efl postgraduate students. Studies in English Language and Education, 8(2), 622–641. https://doi.org/10.24815/siele.v8i2.18863

Rizal, R., Rusdiana, D., Setiawan, W., & Siahaan, P. (2020). The Digital Literacy of The First Semester Students in Physics Education. Jurnal Pendidikan Fisika, 8(2), 101–110. https://doi.org/10.26618/jpf.v8i2.3293

Siahaan, J. P. (2018). Blended Learning, Solusi Pembelajaran di Era Revolusi Industri 4.0. Prosisding Seminar Nasional Fakultas Ilmu Sosial, 2, 565–567. http://semnasfis.unimed.ac.id2549-435X

Silalahi, D. E., Handayani, E. A., Munthe, B., Simanjuntak, M. M., Wahyuni, S., Mahmud, R., Jamaludin, Laela, N. A., Sari, D. M. M., Hakim, A. rahman, & Safii, M. (2022). Literasi Digital Berbasis Pendidikan: Teori, Praktek dan Penerapannya (Herman, Ed.; 1st ed.). PT Global Eksekutif Teknologi. www.globaleksekutifteknologi.co.id

Smith, E. E., & Storrs, H. (2023). Digital literacies, social media, and undergraduate learning: what do students think they need to know? International Journal of Educational Technology in Higher Education, 20(1). https://doi.org/10.1186/s41239-023-00398-2

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Wibawa, R. P. (2022). Media Pembelajaran Ekonomi Berwawasan Literasi Baru di Era Revolusi Industri 4.0 (C. Anam, Ed.; 1st ed.). UNIPMA.

Widayati, A., Wibawa, E. A., Septiana, Y., & Johari, R. J. (2022). Industrial Revolution Era 4.0: Digital Literacy of Accounting Education Students. Dinamika Pendidikan, 17(1), 107–116. https://doi.org/10.15294/dp.v17i1.36645