Digital Literacy Assessment Model in Learning Management System : A Self-Directed Learning Perspective

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Abstract. The learning environment in the post-pandemic era in universities is expected to maintain the use of learning management systems and self-directed learning. In this environment, the digital literacy assessment model needs to be enriched by assessing self-directed learning among students. In this study, a digital literacy assessment model has been developed which is enriched with self-directed learning instruments. The assessment model was tested on 150 students using purposive sampling technique. The results of the assessment were analyzed qualitatively and inferential statistics. The results showed that the level of digital literacy had a simultaneous and partial correlation and influence on students' self-directed learning.

1 Introduction

The main issues in digital literacy are the skills to access, select, and utilize information and the ability to browse massive amounts of information. Thus, the expected ability is not reading and writing, but also knowing what they need, strategies in tracing relevant sources of information, weighing, using and distributing it correctly [1]. The issue became interesting because of the pandemic conditions that caused changes in learning and lecture methods. Online learning has been widely promoted to replace face-to-face learning during the COVID-19 pandemic [2] In Indonesia, the government made a sudden decision by closing all types of activities in schools including learning activities and moving them to learning at home through distance education.

During the COVID-19 pandemic many students have never had adequate experience (if any) with online learning and they are obliged to do so with minimal support (Hussein et al., 2020). The school network has affected 1.6 billion students (94% of the world's student population) in more than 190 countries [3]. A more successful transition to online learning is influenced by user intention and technology usability [1],[2],[3]. Currently, digital technology has become an inseparable part of the world of education.

Of course, various skills are needed to be able to use this technology appropriately and be able to participate in learning activities without significant obstacles. Individuals who learn through technology not only require to have skills and abilities related to the use of technological tools, but also knowledge of the norms and practices of appropriate use, known as digital literacy. Digital literacy is a term that is popularly used today. Digital literacy is

defined as an individual skill in using digital devices to support the achievement of goals in individual life situations. Skills in using digital technology make it easier for someone to learn independently [3],[4].

Self-directed learning is a process in which individuals learn without the help of others supported by digital and mobile technology, technology applications are developed to take advantage of the concept of self-directed learning. Digital technology here includes a variety of computer hardware and software, such as mobile phones, web tools, application software, communication and storage services. One of the reasons cognitive scientists should be interested in self-directed learning is the fact that it is widely considered to enhance learning, especially in educational contexts. Independent learning is considered an important factor in adult learning and is more suitable to be applied to adults. Independent learning in the digital era is also a growing phenomenon with implications for the learning process and learner attributes. Knowles (in [5]) provides the most widely accepted definition of self-directed learning as a process in which "individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning objectives, identifying human and material resources for learning, selecting and apply appropriate learning strategies, and evaluate learning outcomes." The idea that is widely advocated in education is that people who carry out learning activities do better when their learning is self-directed [5]. The essence of self-directed learning is the idea that the learner takes control of his learning. themselves by taking responsibility and deciding what and how something is learned. A learning environment supported by digital technology can solve their learning needs to developments science and technology will contribute to the improvement of human self-directed learning skills. Based on key themes, an updated self-conceptual model directs learning in the digital age that builds on key factors from [7].

Based on the chart above, there are three factors that influence individual independent learning, namely person, process, and context (content). These three elements can be summarized as person, process, and cotext. Person, which includes individual characteristics, such as creativity, critical reflection, enthusiasm, life experience, life satisfaction, motivation, previous education, resilience, and self-concept. Process, which includes teaching and learning transactions, including facilitation, learning skills, learning styles, planning, organizing, and evaluation skills, teaching styles, and technology skills. Context, which includes the environmental and socio-political climate, such as culture, power, learning environment, finance, gender, learning climate, organizational policies, political environment, race, and gender.

Research on independent learning in the digital era is relatively undeveloped, but there is an increasing use of cellular technology as a modality to facilitate independent, informal, and incidental learning [8]. This study aims to conduct a study of digital literacy in an environment related to independent learning. The digital literacy model used is digital literacy skills in operations skills, thinking skills, collaboration skills, awareness skills. This study will identify the dominant factors that have been shown to influence self-directed learning on digital literacy skills by students during the COVID-19 pandemic.

2 Methodology

The method used in this study is a mixed methods method. This research is a research step by combining two forms of research that have existed before, namely qualitative research and quantitative research. According to [8], mixed research is a research approach that combines qualitative research with quantitative research. In [9] explained that the combined research method (mixed methods) is a research method that combines or combines quantitative methods with qualitative methods to be used together in a research activity, in order to obtain more comprehensive, valid, reliable data. and objective.

The emergence of this mixed methods method initially only sought to combine qualitative data with quantitative data, and further clarified in their book entitled Mixed Methodology, that combining qualitative and quantitative approaches emerged after a prolonged debate between the two paradigms that served as guidelines for researchers, both paradigms were positivist/empirical which became the conceptual basis of quantitative and qualitative methods. constructivist/phenomenological paradigm which is the basis of qualitative methods.

The research design used in this research is sequential exploratory, which collects and analyzes qualitative data and then collects and analyzes quantitative data. In this study more emphasis on qualitative methods. The first stage will be filled with the collection and analysis of qualitative data, then the collection and analysis of quantitative data. The combination of quantitative data with qualitative data is usually based on the results obtained previously from the first stage. The main priority at this stage is more emphasized in the first stage, and the merging process between the two occurs when the researcher connects qualitative data analysis with quantitative data collection.

The research location was conducted at Diponegoro University, with centralized data collection in the campus environment, and the objects observed were students who were connected online in an independent learning. Research activities were carried out on subjects in the humanity faculty, science faculty, and engineering faculty, and the number of respondents was 150 students.

This study is an extension of research on digital literacy among students [9] [10], by adding variables that related to self directed learning [11] and the affection of student, namely discipline and initiative, and also confidence and indepence. Furthermore, the relationship between the above variables was investigated using an inferial statistical tool. Table 1 shows the measured variables for the digital literacy ability group, then in table 2 the variables related to self-directed learning are presented.

TABLE 1. List of variable in digital literacy ability

Indicator	Aspect
Operation	Cognitive
	Discovery
	Presentation
Thinking	Analysis
	Evaluation
	Creativity
Collaboration	Teamwork
	Networking
	Knowledge Sharing
Awareness Skills	Ethics
	Law and compliance

TABLE 2. List of variable in self directed learning

Indicator	Aspect
Discipline and initiative	Planning
	Focus
	Exploring the material
Confidence and indepence	Participating
	Self Ability

Digital literacy involves measures related to affection, namely collaboration skills and awareness skills. However, these two measurements are inherent in ICT technical capabilities, and come together with operation and thinking abilities. Meanwhile, the variables related to self-directed learning can be measured before or at a time that does not coincide with ICT technical abilities. For example, planning skills (appears before ICT technical skills work), focus (can appear after technical skills work for a while or for a long time), and independence (appears after technical skills work).

3 Results

In online learning, which is carried out without a transition -from offline to adequate online-, digital literacy is a key factor. High digital literacy can make it easier for students to follow each learning process (which uses various platforms). Examples include the ability to connect devices to an adequate internet network, and install various software for online learning. Both of these are fundamental skills to be able to participate in online learning effectively. In addition, digital literacy also plays a role in streamlining interactions and communication during the learning process. For example, the ability to use the camera and microphone features on the device to be able to be present and connect virtually. Furthermore, the ability to use software to present supporting text and images (graphics, illustrations, etc.) plays a role in optimizing collaboration and communication in online learning, which is bridged by email, online wordsheets and spreadsheets, and the existing 'attach file' feature. on various software [9].

Furthermore, the teaching community at the university realizes that digital literacy skills, which are technical in nature, are only a prerequisite. During the pandemic, students have limitations in accessing information sources on campus, so the information sources that may be accessed are online-based. Online sources of information that are rich in information, require students to have the interest and motivation to access quality information, as an information supplement for online learning that is followed. This is in line with research in [8] which suggests that in online learning, technological literacy is related to skills in utilizing a digital environment that is rich in learning resources [9].

The following data shows the results of measuring digital literacy skills (in table 3) and abilities related to self-directed learning (in table 4).

TABLE 3. List of variable in digital literacy ability

Indicator	Aspect	Mean	Category
Operation	Cognitive	82	Good
	Discovery	90	Very Good
	Presentation	86	Very Good
Thinking	Analysis	84	Good
	Evaluation	88	Very Good
	Creativity	92	Very Good
Collaboration	Teamwork	88	Very Good
	Networking	88	Very Good
	Knowledge Sharing	83	Good
Awareness Skills	Ethics	82	Good
	Law and compliance	82	Good

In the operation indicator, the results achieved are in the range of good and very good. This shows that respondents have basic literacy skills including the ability to read, write, understand symbols, and calculate numbers. In the context of online learning, this ability can be in the form of the ability to understand terms and symbols (icon) used in software, create

a file. In the thinking indicator, the results achieved by respondents are at the level of good and very good. This shows that most respondents have the ability to use the knowledge they already have, to explore new information in order to enrich the knowledge they already have. In the context of online learning, the background information is reflected in the ability to search for information via the internet and select search results to suit the context of the learning being followed.

In the collaboration indicator, the results achieved by respondents are at the good and very good level. This shows that most of the respondents share information with each other. However, in the knowledge sharing aspect, the results achieved by most respondents were not as good as in the teamwork and networking aspects.

The last indicator, namely awareness skill, is the indicator that has the lowest average achievement, only good (not very good). This is indicated by the majority of respondents who have not been able to cite and give attributes to sources of information.

TABLE 4. List of variable in self directed learning ability

Indicator	Aspect	Mean	Category
Discipline and initiative	Planning	82	Good
	Focus	90	Very Good
	Exploring the material	86	Very Good
Confidence and indepence	Participating	84	Good
	Self Ability	88	Very Good
	Creativity	92	Very Good

In the indicators of discipline and initiative, the results achieved by most of the respondents are in the range of good and very good. In general, the respondents had achievements in the good category for the planning aspect, but in the focus and exploration aspects their achievements were at a better level. This is possible because of the lack of ability to show, write, visualize, or express plans in a lecture process [11].

On the indicators of confidence and independence, the results achieved by most respondents are in the range of good and very good. In general, the respondents had achievements in the good category for the participating aspect, indicated by the lack of interaction with materials assigned outside the lecture schedule. In the aspect of self-ability and creativity, the achievements of most of the respondents are very good. This is indicated by the ability to deliver assignments at a time that does not exceed the deadline, and can provide descriptions in varied ways - not only adapting from textbooks and dictates [11] [12].

The relationship between digital literacy ability in the learning management system (LMS) (represented by data in table 3) and self-directed learning (table 4) has a positive correlation of 0.806 (strong relationship), while the percentage value of the coefficient of determination (R2) is 64%. The effect of digital literacy ability using LMS on self-directed learning is $0.000 < 0.005$ with a value of Fcount (86.708) > Ftable (8.56), so it can be concluded that digital literacy skills simultaneously together have an influence on self-directed learning. The coefficient value of digital literacy ability using LMS on self-directed learning is 0.860 with tcount = 6.421 > ttable = 2.12 and the significance value is $0.000 < 0.05$, it can be concluded that there is a significant influence between digital literacy ability on self-directed learning

The results of the research conducted show that there is a correlation between digital literacy skills and self-directed learning. The results of this study prove that Digital Skills include: with a person's digital literacy ability has a positive effect directly on a person's information seeking behavior. Digital literacy is related to an ability to be able to search and

use information actively, and the ability to be able to handle a variety of information formats, which consists of understanding digital and non-digital formats digital, creating and sorting digital information, evaluation information, information literacy, and media literacy. These results are in line with research in [11] which states that online learning can provide flexibility and can encourage the emergence of independent learning and motivation to be more active in learning.

4 Conclusion

The learning environment in the post-pandemic era in universities is expected to maintain the use of learning management systems and self-directed learning. In this environment, the digital literacy assessment model needs to be enriched by assessing self-directed learning among students. In this study, a digital literacy assessment model has been developed which is enriched with self-directed learning instruments. The assessment model was tested on 150 students using purposive sampling technique. In the Operation, Thinking, Collaboration, and Awareness Skills indicator (4 indicator of digital literacy) and also 2 indicator of digital literacy (discipline and initiative, along with Confidence and indepencet) the results achieved are in the range of good and very good. The relationship between digital literacy ability in the learning management system (LMS) and self-directed learning has a positive correlation of 0.806 (strong relationship), while the percentage value of the coefficient of determination (R2) is 64%. The effect of digital literacy ability using LMS on self-directed learning is $0.000 < 0.005$ with a value of Fcount (86.708) > Ftable (8.56), so it can be concluded that digital literacy skills simultaneously together have an influence on self-directed learning. The coefficient value of digital literacy ability using LMS on self-directed learning is 0.860 with tcount = 6.421 > ttable = 2.12 and the significance value is $0.000 < 0.05$, it can be concluded that there is a significant influence between digital literacy ability on self-directed learning

References

1. V. Curran, D.L. Gustafson, K. Simmons, H. Lannon, C. Wang, M. Garmsiri, … L. Wetsch. (2019). Adult learners' perceptions of self-directed learning and digital technology usage in continuing professional education: An update for the digital age. Journal of Adult and Continuing Education, 25(1), 74–93.
2. M.N. Yakubu & S.I. Dasuki. (2019). Factors affecting the adoption of e-learning technologies among higher educationstudents in Nigeria: A structuralequation modelling approach. Information Development, 35(3), 492–502.
3. E. Hussein, S. Daoud, H. Alrabaiah & R. Badawi. (2020). Exploring undergraduate students' attitudes towards emergency online learning during COVID-19: A case from the UAE. Children and Youth Services Review.
4. B.E. Ahmad & F.A. Majid. (2014). Face in Self-directed Learning: The Journey of a Highly Selfdirected Malay Adult Learner. Procedia - Social and Behavioral Sciences, 116(2008), 2717–2721
5. A. Patricia. (2020). College Students' Use and Acceptance of Emergency Online Learning Due to COVID-19. International Journal of Educational Research Open,
6. S.B. Merriam & L.L. Bierema. (2013). Adult Learning: Linking Theory and Practice. Journal of Chemical Information and Modeling, 53(9), 1689–1699.
7. A. Kemp, E. Palmer & P. Strelan. (2019). A taxonomy of factors affecting attitudes towards educational technologies for use with technology acceptance models. British Journal of Educational Technology, 5, 2394–2413.

8. E.M. Meyers, I. Erickson & R.V. Small. (2013). Digital literacy and informal learning environments: An introduction. Learning, Media and Technology, 38(4), 355–367.
9. A. Irhandayaningsih. (2020) The Information Literacy Mapping on Community Empowerment Program in the Coastal Community in Semarang. E3S Web of Conferences 202.
10. A. Irhandayaningsih. (2020) .Pengukuran literasi digital pada peserta pembelajaran daring di masa pandemi covid-19. ANUVA: Jurnal kajian budaya, perpustakaan dan budaya.
11. A. Silamut & S. Petsangsri. (2020). Self-directed learning with knowledge management model to enhance digital literacy abilities. Education and Information Technologies.
12. S.M. Bullock. (2013). Using digital technologies to support Self-Directed Learning for preservice teacher education. Curriculum Journal, 24(1), 103–120.