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Available at:
https://journal.nahnuinisiatif.com/index.php/ARJI
Volume 7 Number 4 Year 2025
DOI : 10.61227
E-ISSN : 2775-0787
P-ISSN : 2774-9290

Action Research Journal Indonesia

2579– 2601

Digital Literacy Skills of Tutors: A Case Study at Universitas Terbuka

Artikel dikirim : 2025-08-22
Artikel diterima : 2025-09-05
Artikel diterbitkan : 2025-10-01

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Keyword:
Literasi Digital
Industri 4.0
Universitas Terbuka
Tutor

Abstract: Digital literacy is a skill to understand and utilize information from various digital sources. Digital literacy skill is useful for dealing with information explosions. In fact, internet users nowadays keep increasing. The problem is that technological advances lead to excessive use of information technology, leading to undesirable cases. Therefore, this study aimed to map digital literacy of tutors at Universitas Terbuka. This research used a quantitative approach with a case study method. Informants used as research samples were 127 tutors from Universitas Terbuka. Data on digital literacy skills of tutors were collected through online questionnaires using Google Form, then analyzed descriptively and inferentially using SPSS Program version 23.00 for Windows. Results showed that instrument used was a digital literacy ability questionnaire consisting of eight constructs with an average Croanbach's alpha value of 0.859 with high criteria. Importantly, results also showed that there was a significant relationship between basic, scientific, economic, information, technological, visual, multicultural, and global awareness. Based on value of correlation coefficient, economic ability, visual intelligence, and technological intelligence had the highest values (0.613, 0.554 and 0.513), showing that the three constructs were better constructs in increasing digital literacy of tutors. In other words, these results provide empirical evidence that tutors' digital literacy is not only influenced by the technical ability to use digital devices, but also by the ability to understand aspects of the digital economy, information visualization, and the application of technology in the context of learning. This certainly has an impact on the quality of teaching and the readiness of tutors in facing educational transformation in the digital era.

INTRODUCTION

Development of digital world, especially in this era of globalization, is inevitable since digital media certainly continues to move forward. Use of digital media has increased significantly over time. Based on the results of a survey from the Indonesian Internet Providers Association (APJII, 2016), the number of Indonesian internet users grew significantly to reach 132.7 million of Indonesia's total population of 256.2 million people, meaning that internet penetration in Indonesia has now reached 51.8% (Surya Dinda Putri, 2018). In 2013, it is estimated that the number of Indonesian internet users has reached 82 million users (Yusrizal, 2016). It shows that, in Indonesia, segment of internet users in children and adolescents is quite high. Based on a research conducted on children and adolescents aged 10-19 years, there are 30 million Indonesian children and adolescents who use internet and make digital media their first choice of communication channels (Qory Qurratun A'yuni, 2015). Furthermore, survey results reveal that children and adolescents have been using online media for more than a year. They use digital media such as computers, laptops, smartphones and tablets to surf the internet. These data justify that digital media is widely used by children to access information through the internet to meet their daily needs.

Based on the aforementioned data, it can be concluded that internet users in Indonesia are increasing over time and its users are starting from children. It then becomes a challenge for educational institutions especially schools that have a significant role in preparing outputs which are able to compete in global era and have good digital literacy skills. Digital literacy is defined as technology skills and knowledge for individuals to develop long-term learning activities and make a good contribution to society (Emre Çam, 2017). Additionally, it is a key skill in education today that covers various types of literacy, such as information literacy, computer literacy, media literacy, communication literacy, visual literacy, and technology literacy (Emre Çam, 2017); (NCREL, 2003a). Digital literacy is able to support younger generation in utilizing information sources that are connected with digital technology and prepare themselves to face various technological challenges today (Emre Çam, 2017). It not only builds skills for accessing knowledge but also builds critical thinking skills towards the use of digital technology (Sari Muliawanti, 2019). One of indicators of achievement in education is success in building digital literacy skills. Thus, here, digital literacy refers to an ability of individuals to apply functional skills to digital devices so they can find and choose information, think critically, be creative, collaborate with others, communicate effectively, and still pay attention to electronic security. For this reason, digital literacy is needed since children as an attempt to make sure that they are able to use and utilize digital media positively as a means of learning from elementary level of education.

Normi Aulia and Ellyn Normelani (2016) strongly advocate that digital media is very useful in all fields of life, such as education, economics, politics, social, culture, and so on. Consequently, its use cannot be separated from everyday life. In education sector, digital media play an important role as an unlimited source of student learning and can

Available at : https://journal.nahnuinisiatif.com/index.php/ARJI
DOI : 10.61227
P-ISSN : 2774-9290
E-ISSN : 2775-0787

be accessed anytime and anywhere according to the needs at various levels of education (Normi Aulia, Ellyn Normelani, 2016). Moreover, digital media also plays a role in helping students be more independent in learning, encouraging curiosity, increasing creativity, and improving students' communication skills (M. Firman Akbar, 2017). Another important point is that educational institutions (schools) need to introduce digital media to students so that they have competence in facing global competition which is currently completely technological. Based on the data above, it can be concluded that digital literacy education is absolutely needed since basic education level so that students are able to use digital media in a healthy and wise manner.

However, a phenomenon that occurs in education sector is low ability of digital literacy in Indonesia. This refers to results of PISA in 2015 (OECD, 2016); (Pratiwi, 2019); (Puspitoningrum, 2019), that Indonesia's reading/literacy level is ranked 62 out of 70 participating countries with an average score of 397. The average reading/literacy score of 70 countries is 493, showing that reading/literacy level in Indonesia is still low and below average (Wahyu Aji Pratama, 2019). It is then confirmed by a research concluding that digital literacy in content evaluation aspect is relatively low (A'yuni, 2015). In addition, average student attending school applies traditional literacy or printed material literacy, such as textbooks, religious books, and story books (Brown, 2013). It causes a limited source of information and learning for students. Implementation of literacy in Indonesia is not yet in line with Industrial Revolution 4.0 concept, that all activities such as learning can utilize internet network. Digital literacy, at present, is certainly important to be applied and developed in learning process in Indonesia.

A number of previous studies have examined digital literacy competencies in the educational environment. For example, Astuti et al. (2025) highlighted the digital reading literacy of prospective English teacher students from the perspective of educators, and found gaps in independent learning capacity and the application of digital literacy in curriculum and teaching practices. In the context of online learning during the pandemic, research by Astuti Muh Amin and colleagues (2022) shows that students' digital literacy is in the medium category, with the dimension of "hypertext navigation" showing the lowest score, indicating the need for improvement through active and innovative learning. Meanwhile, Rinaldi et al. (2020) in the community service program succeeded in improving the digital literacy of elementary school teachers through training in the use of various online platforms and the development of interactive digital materials, which ultimately increased students' confidence and participation in online learning.

However, the three studies have not explicitly explored the relationship between various dimensions of digital literacy such as economic, visual, and technological literacy with the aim of determining which aspects are most dominant in improving tutor digital literacy. This research is different because it not only maps the level of digital literacy of tutors, but also conducts a correlational analysis between digital literacy components. The finding that economic literacy (r = 0.613), visual intelligence (r = 0.554), and technological intelligence (r = 0.513) are the most significant constructs is a novelty. This deeper focus on inter-dimensional relationships provides strategic insights for the

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DOI : 10.61227
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development of more effective and focused training programs, as opposed to previous research that was more descriptive in nature. Thus, this research contributes to the development of the literature by increasing understanding of how various aspects of digital literacy are interrelated in the context of tutors, as well as providing an empirical basis for designing interventions that are more targeted in improving the digital literacy competence of educators.

Unfortunately, it seems that so far there has not been an evaluation of the extent to which tutors make use of facilities in the form of modules during a process of developing insight and skills in successing mastery of a course taken. For that reason, it is important to conduct this research as an effort to find out the role of facilities that have been provided by Universitas Terbuka, whether they are very significant or only as one of fulfillment of requirements without giving a positive effect on knowledge and good skills of tutors at Universitas Terbuka. Mapping digital literacy skills for students is considered important to see tutors profile description by this aspect and whether online learning process or module (hand out) is preferred by tutors in completing courses taken. Therefore, researchers in this case would like to study about "Digital Literacy Skills of Tutors: A Case Study at Universitas Terbuka".

Literatur Review

History of Industrial Revolution

The Industrial Revolution began with the invention of the steam engine in 1784, marking the rise of Industry 1.0, which continues to evolve to this day. This era was characterized by the replacement of human and animal power with mechanical technology. Industry 1.0 lasted until the late 19th century before giving way to Industry 2.0, which introduced mass production through the use of electricity. By the 1970s, Industry 3.0 emerged, marked by the integration of electronics and information technology in manufacturing, leading to automated production processes that increasingly substituted human operators with machines and robots. The latest transformation, Industry 4.0, began around 2012 and is defined by the development of Cyber-Physical Production Systems (CPPS). Unlike previous revolutions, Industry 4.0 emphasizes internet-based or wireless manufacturing systems that allow not only communication but also remote monitoring and control (Kagermann, Wahlster, & Henning, 2013).

The historical trajectory of industrial revolutions reflects significant societal and technological changes. Industry 1.0 was distinguished by mechanization for improved efficiency, Industry 2.0 by large-scale production and standardization of quality, and Industry 3.0 by automation and robotics for flexible mass customization. Industry 4.0 builds on these advancements, integrating cyber-physical systems with manufacturing (Yusmanto, 2017; Irianto, 2017). The term Industry 4.0 itself originated from a German government initiative to accelerate computerization in manufacturing. Its growth is driven by four major factors: (1) greater data availability, computing power, and

connectivity; (2) advanced analytics and business intelligence; (3) new modes of interaction between humans and machines; and (4) the translation of digital information into physical applications such as robotics and 3D printing (Lee, Lapira, & Bagheri, 2013). Fundamentally, Industry 4.0 involves the integration of machines, processes, and systems into intelligent networks capable of autonomous decision-making (Löffler, 2018).

Hermann, Pentek, and Otto (2015) outlined four design principles of Industry 4.0. The first is interconnection, referring to the ability of machines, sensors, devices, and humans to communicate through the Internet of Things (IoT) and the Internet of People (IoP), requiring collaboration, security, and standardization. The second is information transparency, in which digital models replicate the physical world through enriched sensor data and analysis. The third is technical assistance, which includes systems that help humans analyze information for decision-making, perform repetitive or hazardous tasks, and provide both physical and virtual support. The fourth is decentralized decision-making, where cyber-physical systems autonomously perform tasks in the most efficient way possible.

Industry 4.0 makes possible flexible and intelligent mass production (Kagermann, Wahlster, & Henning, 2013), enabling machines to function independently or collaborate with humans (Sung, 2018). It provides real-time synchronization of production processes through integration and adaptive adjustments (Kohler, 2016). Zesulka et al. describe Industry 4.0 as encompassing three interrelated aspects: (1) digital and economic networking from simple to complex systems, (2) digitalization of goods and services, and (3) new market models (Polii, 2020). The Federation of German Industries (BDI, 2016) highlights four main features: Social Machines, Global and Virtual Production Facilities, Smart Products, and Smart Services (Lee, Lapira, & Bagheri, 2013).

E-learning

E-learning, or electronic learning, refers to education conducted using internet technologies and electronic devices as the primary medium of teaching and learning. Effendy defined e-learning as instruction that makes use of electronic equipment and networks to facilitate the delivery of lessons, guidance, and interaction between teachers and learners (Sa'diyah, 2019). This highlights that e-learning is inseparable from hardware such as laptops, computers, and smartphones, as well as reliable internet infrastructure.

Effective e-learning requires supporting facilities such as teleconferencing tools for long-distance communication (Sa'diyah, 2019). Its key advantage lies in enabling learning anytime and anywhere, transcending traditional classroom boundaries. The digitization of materials allows for easier access and encourages student engagement. However, educators must carefully select suitable media, as not all formats are equally effective. Learning media play a pivotal role in stimulating interest and motivating learners to actively participate (Maksudin, 2006).

Appropriate use of media can significantly enhance learning effectiveness. Creative and innovative tools help students better understand material, improve

Available at : https://journal.nahnuinisiatif.com/index.php/ARJI
DOI : 10.61227
P-ISSN : 2774-9290
E-ISSN : 2775-0787

performance, and engage more actively. Research also shows that knowledge retention is higher when students engage with visual and experiential learning compared to passive modes. Hamid (2008) emphasized that media utilization creates a joyful learning environment, making the learning experience more impactful and memorable. Thus, media helps foster a student-centered learning process.

The growing number of internet users in Indonesia has made e-learning increasingly accessible. By 2016, over 69.8% of students already had internet access (Aji, 2018). The benefits of e-learning include unlimited access to knowledge regardless of time and place, enhanced communication and collaboration, increased enjoyment, and more interactive and innovative learning experiences (Anshor, 2016).

Digital Literacy

The rise of globalization and technological development has led to the digital revolution, part of the fourth industrial revolution, where information can be accessed instantly from anywhere (Setyaningsih et al., 2019). Industry 4.0 is marked by artificial intelligence, machine learning, and universal internet access (Cahyadi, 2019). These rapid advances in ICT have transformed every aspect of life, particularly education (Warsito & Bimatara, 2016). Among the essential 21st-century competencies, digital literacy is regarded as fundamental (Griffin, 2015).

While the advancement of technology provides abundant resources, it also poses risks, underscoring the importance of digital literacy. According to NCREL, the Metiri Group, and Burkhardt, literacy in the digital age is not limited to reading and writing but also encompasses interconnected skills relevant to navigating a digital world (Hasibuan et al., 2019). Stokes categorizes literacy into four levels, ranging from basic reading and writing to intellectual and cultural participation (Yanti, 2016). Over time, the term has expanded into media literacy, visual literacy, critical literacy, and information literacy (Sibii, 2009; Jones, 2009; Roberts, 2000; Bawden, 2001). Unlike other literacies, digital literacy is dynamic, multicultural, and ecological (Hawisher et al., 2006).

Digital literacy entails the ability to process digital texts and information, including skills in reading, writing, evaluating, and presenting digital content (Ensmenger, 2012). Research shows that students often prioritize information search skills, though levels of competence may vary (Azmi, 2006; Santos, 2013). Hence, schools must enhance digital literacy to prepare both teachers and students for 21st-century challenges (Asari et al., 2019). More than technical competence, digital literacy also requires critical thinking in evaluating online content (Kurnianingsih et al., 2017; Buckingham, 2015).

Ultimately, digital literacy supports the goals of 21st-century education by equipping students with the skills necessary to adapt to rapid societal changes (Afandi & Junanto, 2016; Sudarisman, 2015). It enables students to engage critically with online information, distinguish between misinformation and credible sources, and apply digital tools in meaningful ways. This study therefore adopts eight digital literacy constructs from NCREL (2003): (1) basic literacy, (2) scientific literacy, (3) economic literacy, (4)

information literacy, (5) technological literacy, (6) visual literacy, (7) multicultural literacy, and (8) global awareness. These constructs provide a framework for evaluating whether students' frequent use of technology translates into genuine digital literacy skills suitable for the 21st century.

Method

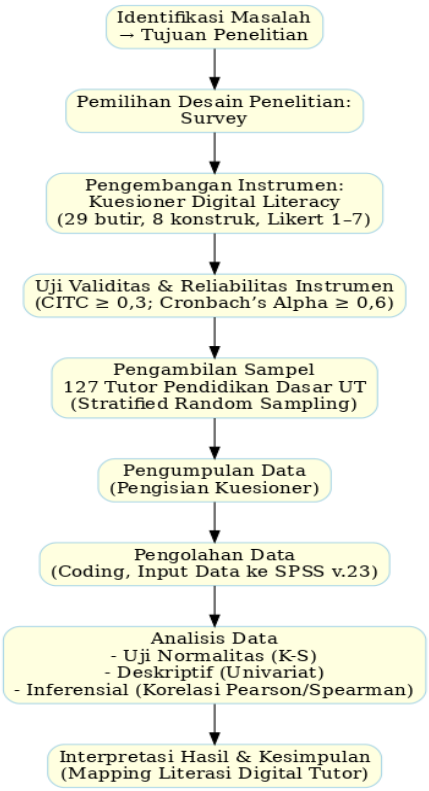

Figure 1. Drawing the research flow

Research Design

The selection of the survey research design in this study is based on the main goal of the research, which is to comprehensively map the digital literacy skills of tutors. The survey method is considered relevant because it is able to describe the conditions, tendencies, and variations of skills that respondents possess in large numbers at any given time. Data were obtained by using instrument in the form of questionnaire (Creswell, 2012). Development of this questionnaire instrument was based on adaptation carried out by (NCREL, 2003a) with a scale of seven consisting of eight constructs that were assessed for their level of validity and reliability so that they could produce quality instruments and measure what should be measured. Questionnaire instrument with a scale of 7 in accordance with theory of digital literacy consisting of 8 constructs was used (NCREL, 2003b) with Cronbach's Alpha value of 0.859, which was declared reliable so that it could be used to measure and evaluate digital literacy of tutor.

Research Sample

This research involved 127 respondents who were primary education tutors at Universitas Terbuka. High number of respondents involved was expected to improve quality of instruments fostered and developed by researchers. Researchers utilized stratified random sampling to ensure that each member of population had same possibility to be chosen as part of sample.

Digital Literacy Questionnaire

This research examined constructs and indicators of digital literacy of tutors. In digital literacy, there were eight constructs used to measure level of digital literacy of tutors at Universitas Terbuka. A measuring instrument in the form of a questionnaire was used to see level of digital literacy of tutors at Universitas Terbuka. Questionnaire was arranged based on eight constructs summarized in concept of digital literacy with a total of 29 questions. Likert scale was utilized as measurement scale with numbers 1-7 with indicators Very Bad (VB/1), Bad (B/2), Somewhat Bad (SB/3), Neutral (N/4), Somewhat Good (SG/5), Good (G/6), Very Good (VG/7). Each item was given a score of 1-7 in accordance with answers chosen by respondents on questionnaire form.

Data Analysis Procedure

As a first step, researchers gave coding manually on questionnaire that had been received. Defining variable was then carried out based on gender, address, agency ownership, age, length of study, ethnicity and questions in each construct. There were 127 data and questionnaire answers entered based on initial coding that had been compiled. In the end, researchers summed up total value of question items based on construct for further testing. At the same time, this test also considered validity and reliability values of each item and question construct. Results of analysis using corrected item-total correlation needed to have a minimum value of 0.3 (Nunnally, 1978) and instrument reliability based on results of Cronbach's Alpha analysis needed to have value above 0.6 and below 1 (Hair, J. F., Anderson, R. E., Babin, B. J, Tatham, R. L., & Black, 2006). Consequently, this research could produce good and quality instruments so that mapping of digital literacy skills of tutors could be conducted. The analysis showed that validity value was smaller than 0.05 (29 item valid) and reliability value of each construct was greater than 0.60. Thus, eight constructs used in this study had been declared reliable, meaning that this instrument could measure what should be measured and could be used to measure and evaluate digital literacy instruments for primary education tutors at Universitas Terbuka.

Descriptive and inferential methods were used to answer research problems (hypothesis testing). Furthermore, researchers used SPSS application version 23.00 for Windows as a data processing tool. Inferential method was utilized to test research hypothesis with a significance level of 5%, which means the level of trust was 95%. Most importantly, previously researchers conducted data normality tests using Kolmogorov-

Smirnov test. As respondents' profile, researchers conducted univariate test (frequency table). This univariate analysis was also carried out for eighth dimensions of construct. Researchers tested correlation between eight constructs as the main test. Correlation test was done if there were at least two variables that were assumed to have a relationship, but it could not be determined which variables were cause and effect. Considering that data were ordinal scale, this correlation test utilized Pearson Correlation if data were normally distributed and Spearman's Rho Correlation if data were not normally distributed. Therefore, researchers tested normality of data before this test was carried out.

Results

Profile of Research Subjects

This research involved 1210 students of Basic Education at Distance Learning Program Unit (UPBJJ) Universitas Terbuka Pekanbaru. Data were analyzed descriptively to produce profiles of research subjects, which are shown in the following Table 1.

Table 1. Profile of Research Subjects

Research Profile	Category	N	Percentage (%)
Sex/Gender	Male	77	60.6
	Female	50	39.4
Address	Pekanbaru City	38	29.9
	Outside Pekanbaru	89	70.1
Number of Agencies/ Workplaces	One	78	61.4
	Two	31	24.4
	Three	10	7.9
	More than Three	8	6.3
Ethnic Group	Malay	37	29.1
	Minang	16	12.6
	Java	30	23.6
	Batak	8	6.3
	Others	36	28.3
Age	< 25 Years	8	6.3
	25 - 33 Years	16	12.6
	33 - 40 Years	50	39.4
	> 40 Years	53	41.7
Length of Service at UT	< 1 Years	19	15.0
	1 - 3 Years	48	37.8
	3 - 5 Years	60	47.2
Employment Status	Civil Servant	43	33.9
	Non-Civil Servant	61	48.0
	Honorary	23	18.1

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DOI : 10.61227
P-ISSN : 2774-9290
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Table 1. Profile of Research Subjects

Research Profile	Category	N	Percentage (%)
Last Education	S1 (Bachelor Degree)	18	14.2
	S2 (Master Degree)	91	71.7
	S3 (Doctoral Degree)	18	14.2

Table 1 shows that there were 50 female tutors (39.4%) and 77 male tutors (60.6%) at Universitas Terbuka. Although males were more dominant than females who were chosen as research subjects, this difference was considered not too significant. Data above also provides information that most of tutors (89 tutors/70.1%) were from outside Pekanbaru. In addition, average tutors (78 tutors/61.4%) had a maximum of only 1 agency/workplace. Meanwhile, most tutors were members of Malay and other ethnic groups as many as 37 people (29.1%) and 36 people (28.3%) respectively. The highest number of tutors teaching at Universitas Terbuka was at age > 40 years (53.7%). Considering age of tutors, they were considered seniors, but it turns out that most of them were Non-Civil Servant, as many as 61 tutors (48%). Additionally, most of Basic Education tutors at Universitas Terbuka were S2 (Master Degree) graduates, totaling 91 tutors (71.7%). Based on the research profile data above, students of Basic Education at Universitas Terbuka had an ideal gender comparison and potential to develop digital literacy of tutors.

Profile of Digital Literacy Skills

Each construct in this research instrument is in a good or very good category as presented in Table 2 below.

Table 2.
Research Subject Perception about Digital Literacy

No	Digital Literacy Construct	N	Min	Category
1	Basic	127	4.85	Good
2	Scientific	127	5.77	Good
3	Economic	127	5.41	Good
4	Information	127	5.9	Good
5	Technological	127	5.83	Good
6	Visual	127	5.35	Good
7	Multicultural	127	6.09	Good
8	Global Awareness	127	5.75	Good
Average of Digital Literacy		127	5.62	Good

Table 2 shows the extent to which the digital literacy of tutors at Universitas Terbuka was at a 'very good' stage, including basic (4.85); scientific (5.77); economic

(5.41); information (5.9); technological (5.83); visual (5.35); multicultural (6.09); and global awareness (5.75). Tutors had excellent digital literacy because they had a mode of up to 5. Thus, it can be concluded that tutors at Universitas Terbuka were tutors who had an average digital literacy of 5.62 with a good category. Data above also shows that scientific, information, technological, multicultural, and global awareness aspects were the highest constructs in mapping digital literacy skills of Basic Education at Universitas Terbuka.

Correlation Between Constructs

As defined by researchers, the digital literacy of tutors at Universitas Terbuka consisted of eight constructs: basic, scientific, economic, information, technological, visual, multicultural, and global awareness. Analysis carried out was correlation test. Parametric alternative to this method was Pearson Correlation. Table 3 below presents results of Pearson Correlation test analysis. Table 3 shows that Sig. (2-tailed) value of each construct was 0.000. Correlation Coefficient significance test results showed that sig. <0.05, so it could be concluded that there was a significant relationship between basic, scientific, economic, information, technological, visual, multicultural, and global awareness. Thus, variable had discriminant validity since correlation matrix with correlation did not exceed 0.90 (Kline, 2015). It then could be concluded that those nine constructs used in this study could definitely improve digital literacy of tutors. It indicates that each construct had a significant relationship.

Tabel 3. Results of Pearson Correlation Analysis of Digital Literacy based on Constructs

		Basic	Scientific	Economic	Information	Technological	Visual	Multicultural	Global Awareness
Basic	Pearson Correlation	1	.450**	.613**	.400**	.513**	.554**	.361**	.469**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	127	127	127	127	127	127	127	127
Scientific	Pearson Correlation	.450**	1	.715**	.694**	.597**	.617**	.534**	.609**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	127	127	127	127	127	127	127	127
Economic	Pearson Correlation	.613**	.715**	1	.569**	.603**	.725**	.472**	.601**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	127	127	127	127	127	127	127	127
Information	Pearson Correlation	.400**	.694**	.569**	1	.596**	.720**	.612**	.576**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	127	127	127	127	127	127	127	127
Technological	Pearson Correlation	.513**	.597**	.603**	.596**	1	.630**	.558**	.538**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	127	127	127	127	127	127	127	127
Visual	Pearson Correlation	.554**	.617**	.725**	.720**	.630**	1	.501**	.571**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	127	127	127	127	127	127	127	127

Available at : https://journal.nahnuinisiatif.com/index.php/ARJI
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Multicultural	Pearson Correlation	.361**	.534**	.472**	.612**	.558**	.501**	1	.745**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	127	127	127	127	127	127	127	127
Global Awareness	Pearson Correlation	.469**	.609**	.601**	.576**	.538**	.571**	.745**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	127	127	127	127	127	127	127	127

**. Correlation is significant at the 0.05 level (2-tailed).

Discussion

Digital literacy of tutors was obtained using a questionnaire. Analysis showed that, in the aspect of digital literacy, research subjects both tutors and students regularly had good digital literacy skills. Literacy skills of tutors were seen based on 8 constructs: basic, scientific, economic, information, technological, visual, multicultural, and global awareness.

The average value of basic construct or basic literacy skills of tutors was 4.85 each with a good category. It means that basic literacy skills are able to contribute to digital literacy ability of tutors. It is in line with Farihatin who affirmed that basic literacy skills are one of indicators of one's academic success (Kharizmi, 2015), by which these skills can be developed by integrating them in cooperative, collaborative and interactive learning (Iis Lisnawati, 2019). Both opinions are reinforced by results of research which found that development of literacy culture can be developed through digital books (Nurchaili, 2016), reading and writing (Suragangga, 2017), thinking skills according to stages and components of literacy (Mulyo Teguh, 2015), and culture of school literacy ecosystems so that they become lifelong learners (Budiharto, Triyono, 2018). Results of the research provide information that literacy skills are a major milestone for tutors in developing education in Indonesia and make a major contribution in developing basic literacy skills.

Importantly, scientific construct or scientific skill of tutors obtained an average value of 5.77 each with a good category. This result is in line with research which affirmed that ability of scientific literacy is in the category of moderate improvement (Ardian Asyhari, 2015); junior high school students have good scientific literacy skills in aspects of science knowledge and competencies (Nisa Wulandari, 2016); science literacy learning outcomes of experimental class students are in moderate category (Theresia Yulin Budiningsih, Ani Rusilowati, 2015); (Titis Perwitasari, Sudarmin, 2016). The results of the research illustrate that research respondents had good scientific literacy skills during learning process. In line with the results of the research, we can understand that digital literacy skills are needed, especially in the 21st century (Liu, 2009). Importance of this literacy skill encourages researchers to make it an important topic to be studied and has a great opportunity to be published in various journals both at national and international levels (Bulent Cavas, Pinar Cavas, Yasemin Ozdem, Miia Rannikmae, 2012). It is because the mastery of mathematics, physics, chemistry, biology and the environment is the foundation in improving understanding of science and technology (Cardwell, 2005).

Thus, scientific literacy skills are intended for everyone so that skills of reasoning and scientific thinking in social contexts are absolutely necessary.

Economic construct or economic skill of tutors obtained an average value of 5.41 with a good category. It proves that tutors are capable enough to make right and smart economic decisions in their daily lives to achieve prosperity. It is in line with research that strongly advocates that level of economic literacy of students is in moderate category of 62% (Stevani, 2018). This is consistent with Mathews's opinion that economic literacy is an ability of individuals to recognize and use economic concepts and ways of thinking economically to improve and obtain prosperity (Sina, 2012); (Stevani, 2018); (Anggreini & Waspada, 2020). Moreover, Caplan also stated that economic literacy is a much needed knowledge of economy (Murniatiningsih, 2017). It then can be understood that economic literacy is one of the tools to achieve goals. People who are smart in managing economic resources indicates economic literacy (Sina, 2012). Another indicator is to be a good individual (Farah Margaretha, 2015). Thus, importance of economic literacy can minimize one's consumptive behavior in consumption.

Information construct or information skill of tutors obtained an average value of 5.90 with a good category. It is supported by results of research which concluded that librarians tend to have information literacy with good average values (Rahmala et al., 2018). This result is also in line with an opinion that information literacy is a life skill that needs to be possessed by academic community (Sitti Husaebah Pattah, 2014); (Hasnadi, 2019).

Research on information literacy lately is increasingly being conducted and is becoming a trend in scientific studies including: 1) integration of information literacy into web-based tutorials in collaboration between faculty and librarians in Thailand (Techataweewan & Woraratpanya, 2009); 2) based on theory of new information literacy, educators and non-formal education educators in Jakarta province are generally at level of knowing information needs, knowing how to access information, being able to evaluate information, and being able to use information (Mulni Adelina Bachtar, Arifah Sismita, 2009); 3) librarians of public libraries in Jakarta provinces have good information literacy skills (Sitti Husaebah Pattah, 2014). Considering the importance of information literacy for tertiary institutions, culture of information literacy needs to be done through an emphasis on lecturers being used as role models and assignments given by lecturers to students at each lecture (Nunuk Hariyati, Syunu Trihantoyo, 2018). An application of literacy culture can develop intellectual intelligence, emotional intelligence and moral intelligence (Aini, 2018) and lead to habit of thinking that is followed by process of reading, writing that can create works (Mursalim, 2017). Literacy study center is a place for developing literacy movements in higher education institutions as an effort to be able to improve literacy culture through both conventional and modern media. Based on the discussion, literacy culture needs to be directed as a campus community movement in building a literacy culture.

Furthermore, technological construct or technological skill of tutors obtained an average value of 5.83 with a good category. It is supported by research that found that

Available at : https://journal.nahnuinisiatif.com/index.php/ARJI
DOI : 10.61227
P-ISSN : 2774-9290
E-ISSN : 2775-0787

technology literacy that students have is in moderate category (M. Firman Akbar, 2017). Previous research also explains this phenomenon. High intensity of someone to search for something by using internet does not guarantee high digital literacy (Qory Qurratun A'yuni, 2015). It is because digital literacy is not only seen by use of digital devices, but also with other competencies such as ability to evaluate content obtained from the internet. Thus, technological literacy has an important role in learning process, especially during COVID-19 pandemic. Technology literacy is a key and foundation of education during this condition (Z. Ezzaaine, 2007); (Nilgun Ozdamar-Keskin, Fatma Zeynep Ozata, 2020). Technology literacy also has a role in facilitating access to information and managing information that supports distance learning during COVID-19 pandemic. Technology literacy can help tutors to access information sharing from available sources. ISTE Standards for Student points out that ability to find effective information by choosing right keywords is a technological literacy that students must master (Arif Santoso, 2019). Exposure to the role of technology literacy shows that technological literacy is very supportive of existence of technology that is a medium and a means of implementing distance learning during COVID-19 pandemic. It can be said that technological literacy can make tutors and students look for information quickly and precisely because they know location and keywords that are in accordance with information needed for learning purposes.

Visual construct of tutors obtained an average value of 5.35 with a good category. It is supported by research that found that good visual media literacy skills of students make learning process easier (Mansyur et al., 2013); (Sidhartani, 2016). One form of literacy that has a major influence on human interaction with environment is visual literacy (Sidhartani, 2016). Results of observation showed that tutors have not yet achieved visual literacy awareness. It is undeniable that the absence of a visual literacy culture has resulted in ignorance of tutors in being responsible for the work they create. Here are some related studies: 1) Fatah said that community members requently think visually when they read books, especially various entertainment books (Agus Setiawan, 2019); and 2) good visual literacy competencies are able to shape a person to be able to express ideas that encapsulate their thoughts and inform them again to others (P.B, 2017). Use of visual literacy supports an ability to remember information and enable them to present it again in their own way. An ability of visual literacy is the same as thinking ability. Well-managed visual in learning process can improve ability to use prior knowledge in learning new knowledge. Visual instructional design can be an option for developing visual literacy in learning process.

Multicultural construct of tutors obtained each average value of 6.09 with a good categroy. Multicultural literacy is closely related to cultural literacy. According to World Economic Forum 2015, one type of basic literacy that must be mastered by current generation of industry 4.0 is cultural literacy (Helaluddin, 2015). Multicultural literacy is a threshold concept (Anggi Pratiwi, 2019); (Gabriel García Ochoa, 2016). Furthermore, multicultural literacy is also interpreted as a modus operandi that highlights

communication, comparison and criticism, bringing ideas together in interdisciplinary and international collaboration (Helaluddin, 2015). Muller describes several criteria of cultural literacy, including: 1) understanding complexity of culture and all cultures, 2) being able to analyze cultural attributes themselves, identifying and deconstructing existing stereotypes, 3) caring about cultural components, 4) preferring to be cultural relativists rather than fundamentalists culture (Kelsey Halbert, 2015). Multicultural literacy has many benefits in aspects of life, one of which is an important role in building a civilized nation. Through multicultural literacy, we are expected to minimize individualistic attitudes, avoid group egos, avoid misunderstandings, and encourage cooperation (Vismaia S. Damaianti, Lira Fessia Damaianti, 2017). As individuals, cultural literacy functions in helping good interactions from a variety of different backgrounds. It means that cultural literacy helps people to develop a critical cultural perspective. In case we belong to dominant group, we need to see others from marginal group as a normal culture by evaluating strengths and limitations of that culture (Helen Flavell, Rosalie Thackrah, 2013).

Based on the aforementioned importance of cultural literacy, it is necessary to increase competence of educators in introducing cultural diversity in educational process in schools. In accordance with development of current era, an educator, both teacher and lecturer, need to have various skills in teaching their students to achieve 21st century competence.

Last but not least, global awareness construct of tutors obtained each average value of 5.75 with a good category. Global awareness is one of four specific themes which are relevant to modern life (Siti Zubaidah, 2016). In this case, NCREL & Metiri Group affirmed that there are seven literacies in improving learning systems in Indonesia including global awareness literacy that students must master (Yokhebed, 2018). Global awareness covers (1) utilizing 21st century skills to understand and reach global issues, (2) studying and working collaboratively with individuals of different cultures, religions, and lifestyles with a spirit of mutual respect and having dialogue in a personal, work context, and community, (3) understanding other nations and cultures, involving use of non-English language, finance, economics, business literacy, and entrepreneurship, (4) knowing how to make appropriate personal economic choices, (5) understanding role of economics in society, and (6) using entrepreneurial skills to increase productivity and career choices (Redhana, 2019). Global awareness literacy is one of driving indicators and models of responsibility and digital society (Tarihoran, 2017). Developing and modeling global awareness can be done through engagement/participation with colleagues and students from other cultures using digital communication and collaboration tools.

Implications of the Impact of The Research Results

The results of this study have significant practical implications for the development of tutor competencies in the digital era. The findings that economic skills, visual intelligence, and technological intelligence have the highest contribution to improving digital literacy suggest that tutor training programs should be geared towards

these three main aspects. Practically, educational institutions and training providers can take advantage of these results to design more targeted digital literacy modules or curricula, for example by strengthening digital resource management skills (economic ability), increasing the use of visual media in learning (visual intelligence), and mastery of internet-based technology (technological intelligence).

In addition, the results of this research also contribute to human resource development policies in the field of education, because it can be the basis for schools, madrasas, or non-formal institutions to prepare tutors who are better prepared to face the challenges of the Industrial Revolution 4.0. Tutors who have strong digital literacy will more easily adapt to technology-based learning, so that learning can be more effective, interesting, and relevant to the needs of today's digital generation.

Conclusions and Limitations

Based on analysis, results of the research and discussion that had been revealed previously, it is concluded that digital literacy ability of tutors at Universitas Terbuka has a good category. It can be seen from each construct which is also in a good category, including basic (4.85); scientific (5.77); economic (5.41); information (5.9); technological (5.83); visual (5.35); multicultural (6.09); and global awareness (5.75). Additionally, data also show that aspects of scientific, information, technological, multicultural, and global awareness are the highest constructs in mapping digital literacy skills of Basic Education at Universitas Terbuka. Importantly, instrument used was a digital literacy ability questionnaire consisting of eight constructs with an average value of Cronbach's alpha of 0.859 with high criteria. The results also conclude that there are no significant differences in digital literacy based on gender, address, agency ownership, age, length of study, and ethnicity. In addition, based on respondents' profile factors, results show that there is a significant relationship between basic, scientific, economic, information, technological, visual, multicultural, and global awareness. Based on the value of correlation coefficient, economic ability, visual intelligence, and technological intelligence have the highest values (0.613, 0.554 and 0.513), showing that the three constructs are better constructs in increasing digital literacy of tutors.

This study has several limitations. First, the definition of competence in digital literacy skills used in this article focuses on the views of NCREL. Therefore, it needs consideration from various previous studies such as Partnership for 21st Century Learning. In addition, training and assistance are needed to strengthen the competence of digital literacy skills and then to continue experimental research on the assistance that has been done. Then, it is known that there are three important factors, namely economic capability, visual intelligence, technological intelligence, this needs to make seriousness for leaders to be able to improve the competence of digital literacy skills that are more optimal. And the most important thing is that this study does not show any difference in literacy compared to ethnicity, gender and length of study.

Available at : https://journal.nahnuinisiatif.com/index.php/ARJI
DOI : 10.61227
P-ISSN : 2774-9290
E-ISSN : 2775-0787

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