

Strengthening Digital Literacy toward Students in Facing Education Era 4.0

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Abstract. This article discussed about the importance of strengthening digital literacy toward students in facing education era 4.0. In this technological acceleration era, the ability of digital literacy becomes so important, because by having good digital literacy students would be able to get valid information which can be used as learning resources with sort it out and read analytically developed by digital literacy. It also becomes anticipative effort to prevent scattered hoaxes in order to students could be wiser in responding an information. Digital literacy is worked with three steps. There are habituation, implementation, and development in teaching and learning activities handled by teachers and also by creation of friendly school environment with literacy.

Keywords: Digital Literacy, Student, Education Era 4.0

1 Introduction

Nowadays, Indonesia is facing a new industrial era marked with digitalization in various life sectors which the experts call as industrial revolution 4.0. There is a dynamic change in the rate of movement that was initially centralized in human as the subject and replaced by automatic machine and digital technology [26]. Era 4.0 is disruptive innovation era where innovation continuous developing rapidly and information becomes basis in daily life.

This era influences all aspects of human life, include education, so that education era today called as education era 4.0. The characteristic of this era is the use of digital technology in learning process known as cyber system. In this era, several paradigm shifts occurred in education, such as in learning approach. In the traditional era, teachers become central figures in teaching-learning activities where they are as the only and main knowledge source in the class. But, in the modern era today technology develops quickly and shift teacher's role. Teachers become no longer central figure but rather as facilitator for their students. Learning initially centered on teachers turned into students [18].

Now, students easily access all needed information as study material from internet [23]. The easiness of internet access should be balanced with briefing about enough digital literacy so that students become wiser and not affected negative effect [5]. Easiness of getting information sometimes makes us forget to filter the information. The access easiness often brings us to the negative effect caused disunity. Hoax, slander, and information that cannot be justified its truth could be easily found and believed as a truth itself [29].

Internet will bring positive effect if it is used to the positive things and in the contrary, depends on our understanding toward its benefit and use. Internet also could endanger young generation if it does not use as it should be [30]. To anticipate the negative effect of internet, because of information access easiness, so education about digital media literacy becomes so

important. Especially toward students who cannot filter information well. The urgency of digital literacy, for students in education era 4.0, is so significant, considering now students use internet media as one of learning sources.

In the midst of a lot of information in digital media, even known as ‘tsunami of information’, digital literacy skill becomes strategic capability. Scattered hoaxes should be anticipated with the sorting and reading ability analytically, in order to get valid information. The ability of looking for information source which can be accounted for, becomes so important in the midst of digital technology acceleration today [31].

Nowadays, the research conducted Lembaga Guruku Hebat shows the abuse of internet because lack of digital literacy students use internet for social media than learning source. This research involved 397 students and teachers of SMA/SMK (senior/vocational high school) in Surabaya. The aimed of this study is to know internet usage among students in Surabaya. Istidha Nur Amanah, researcher and anthropologist revealed her research about the intensity of internet usage which continuous increasing each year. In Indonesia, based on data released APJII (Asosiasi Penyelenggara Jasa Internet Indonesia) on 2018, 64,8 percent (171,17 million people) from total Indonesia population 264 million people is internet user[32]



Source: <https://www.apjii.or.id>

Amanah also added that in this digital era the utilization of information technology to support learning is bigger, moreover digital literacy becomes so important for students in this industrial revolution era 4.0. The result of the research also showed that 36,6 percent student's Surabaya use internet 5-8 hours per day. They used internet for surfing in social media than looking for learning material or game. Whereas, social media does not contribute positively to the provision of learning material [32].

Digital literacy is an ability of using information and communication technology (TIK) to find, evaluate, utilize, make, and communicate content/information, with cognitive or technical. Digital literacy is needed to drive positive impact of internet. Knowing these realities, strengthening digital literacy is needed a lot by students. This research would discuss about how the strategy of planting and strengthening digital literacy toward students in education era 4.0.

The Ministry of Communication and Information on 18 February 2014 in the International Day Seminar on the Use of Digital Media in Children and Adolescents in Indonesia, also stated that from research conducted on children and adolescents aged 10-19 years, there were at least 30 million children and Indonesian teenagers who use the internet and make digital media their first choice of communication channels. The study found that 80 percent of respondents surveyed were internet users, with evidence of a strong digital divide between those who live in urban areas and are more prosperous in Indonesia, and those who live in rural (and less prosperous) areas. In the Special Region of Yogyakarta, Jakarta and Banten, for example, almost all respondents are internet users. While in North Maluku and West Papua, less than one third of the respondents used the internet.

The majority of those surveyed have used online media for more than a year, and almost half of them claimed to have first learned about the internet from friends. This study revealed that 69 % of respondents used computers to access the internet. About 34 using the laptops, and only 2 % are connected via video games. More than half of respondents (52%) use mobile phones to access the internet, but less than a quarter (21%) for smartphones and only 4 % for tablets. This research collects data to direct policy forward in protecting children's rights to access information and, at the same time, share information and express their views or ideas safely[33].

Based on the results of a survey conducted by the Ministry of Communication and Information, it can be seen that adolescents are among the most age groups accessing the internet. The discussion about the behavior of internet use by adolescents can be explained from several previous studies that have been done to teenagers, both junior high school, high school students and students in the city of Surabaya. Based on the results of studies on adolescent behavior in urban areas, it can be seen that teenagers at the junior and senior high school levels as early teens also access the internet for the purposes of assignments and several other activities[33]. The results of the study also state that students' dependence on the internet to find sources or materials related to assignments or lessons is increasing today.

Furthermore, students as late teens also use the internet in their daily lives. The results of the study explained that students also use the internet for media to communicate / interact with each other for example through social networks. Not only that, students also use the internet for scientific information related to academic interests in the form of lecture assignments, research results, journals and scientific articles[17].

Based on the facts reinforced by some of the results of the above research increasingly clearly visible the urgency of digital literacy education for students. In this study, it will be discussed how teachers as the main actors in the education institutions should be know digital literacy for students and strategies that should be used so the students will have a balanced knowledge of digital literacy with very rapid technological developments.

2 Literature Review

There are several studies that have been conducted regarding digital literacy in education era 4.0. They are: :

First, a research which was conducted by Hamidulloh Ibada with the title 'Penguatan Literasi Baru pada Guru Madrasah Ibtidaiyah dalam Menjawab Tantangan Era Revolusi Industri 4.0.' The result shows the importance of new literacy application in elementary school/ibtidaiyah. This research focuses on teacher's literacy in which according to Ibda strengthening literacy toward teachers as key of change, curriculum revitalization based on literacy and reinforcing teacher's role and competency in education era 4.0. This is the differentiator between this research and the research which the writer will conduct where she focuses on digital literacy toward children as the main subject in education[10].

Second, a study under the title 'Membangun Karakter Siswa melalui Literasi Digital dalam Menghadapi Pendidikan Abad 21 (Revolusi Industri 4.0)' conducted Uswatun Khasanah and Herina. That research states that the application of digital literacy habituation in learning in the school can build the character of modern students and have an understanding toward literacy dimension which is useful in helping learning and material development process[12].

Third, Nur Ainiyah's research under the title 'Membangun Penguatan Budaya Literasi Media dan Informasi dalam Dunia Pendidikan.' This research states that literacy culture which is built in the education sector as an anticipative and critical effort over clutter information in this technological era today[1].

3 Methodology

This research categorized as the qualitative research that used a library method, the data sources are completely come from library and documentaries[28]. The writer studies data sources from literatures which are related to education, digital literacy, and industrial revolution 4.0 themes. The data collection method used is the literature review aimed at finding data and information through related document and literature which could support in the process and research result[25].

The technique used to analyze and present the data in this research is the descriptive-analysis method, namely by explaining the data and facts collected from the literature then analyzing the research objectives the writer wants to achieve.

In qualitative research, three stages that must be done in analyzing data, namely reducing, presenting data, drawing conclusions. Data reduction aims to classify, sharpen, direct, select what is important and remove unrelated things and organize data comprehensively so that conclusions can be drawn and verified[22].

4 Result and Finding

4.1 Education Era 4.0

Education era 4.0 is common term which is used by educational theorist to describe various ways of integrating cyber technology physically or not into learning process. This era is a leap from education 3.0, which according to Jeff Borden covers meeting among neuroscience, cognitive psychology and education technology that use digital and mobile technology based on web, include application, hardware, software, and other things with 'E' in front[34].

Education 4.0 is phenomena responding the fourth industrial revolution need where people and machine harmonized to get solution, solve problem, and find the possibility of new innovation. Elementary until campus education adapt educational curriculum with challenge and need in this era[35].

Talking about industrial revolution 4.0 and its relation to education, education is the main and central thing to follow current of this industrial revolution because it will create quality generations that fill industrial revolution 4.0. Education in industrial revolution era 4.0 is a change from learning way, paradigm, and acting way of students in developing creative innovation in various sectors.

According to Muhadjir Effendy, facing industrial revolution era 4.0 education sector need to revise curriculum by adding five competencies that should belong to students. They are critical thinking skill, creativity and innovative, communication skill, ability to work together and collaboration, and confidence[36].

Besides that, to create competitive alumni so it is needed new orientation in curriculum which does not cover reading, writing, and math skill, but also understanding digital literacy related and will be useful in education era 4.0 so that they be able to read, analyses, and use digital information well[14].

4.2 Digital Literacy

Before talking digital literacy, it is better if we discuss about literacy in general. Generally, literacy is ability of individuals to process and understand information when they are reading or writing. Literacy is more than the ability of reading and writing, so that way literacy cannot be separated from language and verbal skill which requires a series of cognitive and knowledge skill about genre and cultural[37].

UNESCO gives comprehensive definition about literacy, is ability to identify, understand, interpret, create, communicate, and count using printed and writing materials related to various sectors. It involves sequence of learning which allow individuals to reach their goals in developing knowledge and potency and fully participate in the society[38].

Studies on digital literacy have been carried out by several experts in the international sphere such as America, Europe, Australia, Asia and Africa. Like David Bawden, Gloria E. Jacobs, Sonia Livingstone, Guy Merchant, to Ezter Hargittai[15]. Its development has also been quite rapid from year to year, it can be known based on the results of research conducted by Mathar which states that there are a number of 843 articles on digital literacy studies that have been published and around 661 articles of which are already in English. The writing is not only done by a single writer, but also by the collaboration of several authors[2]. This demonstrates the field of digital literacy is fascinating enough to urge specialists to collaborate with other in building up the computerized proficiency study.

In the ideas context, Indonesia people do not have strong literacy foundation yet. Based on report of Program for International Student Assessment (PISA), at 2012 literacy tradition of Indonesia people ranked 64 from 65 countries researched. While, student's Indonesia reading index ranked 57 from 65 countries studied[31]. Ministry of Education and Culture has launched school literacy movement in 2015 ago. This program aimed at increasing human

resource quality by using culture of information understanding that is reflective, analytic, and critical[36].

Formally, digital literacy appears on National Working Meeting (Rakernas) Ministry of Research, Technology & Higher Education (Kemendiknas) on 17 January 2018. This idea arises as part of preparation related institution in facing disruption era. Literacy discussed in this meeting is data, technology, human resource. People should utilize and process data, implement them into technology and understand technology usage. In this era, human literacy becomes important, aimed at people can interact well with environment and society[39]. Hamidulloh Ibda also added in the past we just used old literacy (reading, writing, and counting), now we should implement new literacy (data, technology, and humanism)[6].

The next, literacy discussed in this study is digital literacy, as proposed for the first time in 1997 by Paul Gilster who stated that digital literacy is ability of using technology and information from digital devices effectively and efficiency in various aspects, such as academic, carrier, and daily life[21]. This definition then perfected by Eshet who stressing that digital literacy should be more than ability of using various digital sources effectively but also a certain way of thinking[3].

Bawden developed the concept of digital literacy more comprehensively based on computer and information literacy than Gilster stated digital literacy covers some aspects, they are :

- a. Assembling knowledge that is ability to build information from various trusted sources.
- b. Ability of serving information, include critical thinking in understanding information by paying attention validity and source completeness from internet.
- c. Ability of reading and understanding non-sequential information and dynamic materials.
- d. Awareness about the important role of conventional media and relate it with networked media (internet).
- e. Awareness toward people network access which be able to be used as referral and help sources.
- f. Using filter toward the coming information, and
- g. Feeling comfortable and having access to communicate and publish information [3].

If we use Bawden's opinion, so digital literacy is therefore more associated with technical skill of accessing , arranging, understating, and spreading information[40]. Gilster classifies four core competencies that needed by the person who understand digital literacy,including:

- a. Internet Searching

This competency includes several components namely the ability to search information on the internet using search engines, as well as carrying out various activities on it.

- b. Guide Hypertextual (Hypertextual Navigation)

This competency includes several other components, such as knowledge of hypertext and hyperlinks as well as how they work, knowledge of the differences between reading textbooks and browsing via the internet, knowledge of how the web works includes knowledge of bandwidth, http, html, and url, as well as the ability to understand the characteristics of web pages.

- c. Content Evaluation Information

This competency includes several components, among others, they are: ability to distinguish between display and information content, namely user perception in understanding the appearance of a webpage visited, ability to analyze background

information on the internet, namely awareness to explore further about sources and makers of information, ability to evaluate a web address by understanding the various domains for each institution or country, the ability to analyze a web page, as well as knowledge of the FAQ in a newsgroup / discussion group.

d. **Compilation of Knowledge (Knowledge Assembly)**

This ability is needed to collect and evaluate facts and opinions properly and without prejudice. This ability for certain purposes both education and employment. The ability to crosscheck or re-examine the information obtained, the ability to use all types of media to prove the truth of information, and the ability to compile sources of information obtained on the internet with real life that is not connected to the network[3].

4.3 Strengthening Digital Literacy toward Students in Facing Education Era 4.0

Literacy in education sector officially appears in government program through Ministry of Education and Culture (Kemendikbud) developing School Literacy Movement (GLS). It is comprehensive effort involving all elements in the school (teacher, student, and parent) and society as part of education ecosystem. GLS is one of means to strengthen growth of manners based on Regulation of Ministry of Education and Culture Number 23 2015. One of activities as the implementation of that policy is reading non-lesson book before study time started for 15 minutes[27].

As one of efforts to respond revolution era 4.0, that is strengthening literacy competency Ministry of Education and Culture (Kemendikbud) on January 2018 released ideas of new literacy. Old literacy covers reading, writing, and counting (calistung). Meanwhile, new literacy covers literacy of data, technology and human. Data literacy related to ability of reading, analyzing, and making conclusion think based on data and information (bid data) obtained. Technology literacy related to skill of understanding how machine works. Technological application and work based on technological product to get maximum result. And human literacy related to communication skill, collaboration, critical thinking, creative, and innovative.

In facing industrial revolution era 4.0, students are not enough to be equipped only with understating of literacy in old form. They have to be supplied with newness in literacy which writer calls it as digital literacy. Digital literacy is a new form of new reorientation in education organization.

Educated people demanded to be more careful in seeing through quality information in the midst current of digital information developing rapidly. Digital literacy could be used as sophisticated learning materials, it refers to O'Brein and Scharber's opinion in Puspito[19]. Using digital material does not only ease, but also brings other authentic ideas about digital materials. The others use of it, is to stimulate students to enjoy reading outside class time and foster self-confident.

Literacy capacities (reading, listening in and writing) is base abilities for student, associated with digital literacy these aptitudes can be performed in advanced media, for example, PCs, web and cell phones. In digital literacy student begin the learning process by

welcoming to recognize hoax and true news that is spread on the internet. In addition, student are additionally known the sites that are valuable for learning and how to utilize it like learning applications [40].

Based on Ministry of Education and Culture's Regulation (Permendikbud) Number 23 2017 about School Day, there are several things strengthened from Curriculum 2013 revise 2017, they are (1) strengthening of character education, (2) literacy mastery, and (3) strengthening of high order thinking skills. While characters emphasized on the aspects of religiosity, nationalism, and independence, mutual cooperation (gotong-royong), and integrity. In literacy mastery emphasized on 21 century literacy that is summarized 4C, i.e. (1) creative, (2) critical thinking, (3) communicative and (4) collaborative. 4C aspects include several high-level thinking competencies [6].

Strengthening literacy toward students could be done by teacher through three steps, they are (1) personal habituation, (2) learning implementation, and (3) developing in various educational activities [41].

This first step, personal habituation by exploring various references to upgrade understanding toward reading content. Habituation which continuously will produce reading culture. Habituation of understanding reading content through reading would produce personal power and thinking skill. Personal ability meant is analysis process's speed of reading content through thinking process. The analysis process's speed of reading content which be able to be actualized in various responses is one of basics in digital literacy. The phenomena of many teachers do not cultivate reading is more difficult to understand digital information materials. It is suspected that thinking response not trained to understand reading material because of reading culture does not occur. Therefore, the strategy of reading habituation continuously to understand reading content is part of digital literacy.

The second step is implementation of learning which is an activities integrating various digital program in learning process. Digitalization that can be done is digitalization of learning process, teaching material, learning media, and learning evaluation by using various application programs. Digitalization needs trained skill. It tends to become problem for some teachers. The effort of training students their selves through various individual (learning by her self) and group (KKG/MGMP) should be done and programed continuously. Individual digital skill could develop and in the contrary could left behind due to the development's digital program application itself. So that way, the use of digital material continuously in learning process, digitalization of teaching material, learning media, and learning evaluation could develop digital literacy ability and it can be called as teacher's effort adapting in industrial revolution era 4.0.

The third step is development in various educational activities. It is the steps developing student's digital literacy ability. Teacher activity in various digital literacy developments both programed and planned by school internal or external should be followed. The strategy of digital literacy through those three steps which is done continuously will create effective and efficient digital literacy culture and has retention power of sustainable digital literacy ability. The realization of those digital literacy steps becomes guarantee that teachers could adapt to industrial revolution era 4.0 and even to the next industrial revolution.

According to Puspito, in developing digital literacy in school, so there are three things should be paid attention[19]:

- a. Creating the friendly literacy atmosphere. The effort is by developing habit of displaying students' outcome in all area school. In order to school environment is comfortable so student's outcome displayed in rotation, so that all of students have chance to be caring.
- b. Creating social and school affective environment as literal figure of communication and interaction. Social and affective environment designed and expanded by giving award toward students' effort. It is a recognition form toward all students' work.

Creating school as literal academic environment. It can be realized by designing and implementing literacy movement in the school in which establishes school literacy group making program, implementation, and planning assessment.

5 Conclusions

In facing industrial revolution era 4.0, education sector should be able to adapt through systematically strategy in accordance with orientation and dimension industrial revolution 4.0. Generally, industrial revolution era 4.0 is automation all the activities that are academic and non-academic. Automation by using digital technology is the main characteristic of this era so that all businesses simplified, but it can reduce even dispel human role. The adaptation of education sector could be done through strengthening digital literacy and empowering critical thinking skill. Digital literacy is worked with three steps. There are habituation, implementation, and development in teaching and learning activities handled by teachers and also by creation of friendly school environment with literacy.

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