The Website-based Information Literacy system and Application in Education Facing the Age of Industrial Revolution 4.0

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Abstract. This article discusses about the importance of web-based information literacy systems in the era of the industrial revolution 4.0. This era was built on the integration of intellectual (artificial intelligence) with the physical world by opening unlimited space and opportunities for humans to access information and interact virtually fast and easily and very low cost. Therefore, the industrial revolution 4.0 is perceived as a new age that will open opportunities as well as challenges for human life, including for education. In facing this era, high intelligence is needed to explore educational resources and to apply technology that is relevant to the evolving virtual reality. This web-based education information literacy system is one solution to facilitate students in obtaining, designing and processing knowledge and skills needed in their future lives. Education managers must innovate and utilize this system by continuously updating the latest so that the outputs and outcomes of education will be ready to face the rapidly advancing technological developments. Education is not only maintaining and preserving the tradition (culture) of society about learning but it is carving and engineering the future of the young generation in the face of global world competition that continues to roll without any time and space limits.

Keywords: system, information literacy, education and industrial revolution 4.0

1 Introduction
Beginning in 2010 the era of the industrial revolution 4.0 was introduced to the world through the Cyber-Physical System (CPS) and the Internet of Things and Services (IoT and IoS) as its main foothold. Initially, the 4.0 industrial revolution emphasized an industrial process that included manufacturing and logistics, but in its course, this 4.0 era fundamentally reduced the mindset and human life order in interacting and communicating with its people. Meanwhile, Japan currently has designed a wave of the 5.0 industrial revolution or the super-smart era. Various other activities such as economic, political, social, cultural and even religion cannot be separated from its influence, so it is also known as the era of Disruption society [1]. Disruption itself is interpreted as "innovation" as well as "threats" [2], namely threats to cultural concepts and values that already exist and are firmly entrenched before.
Disruption society as the real change and global word system in the 4.0 era continue to develop massively and change people’s lifestyles. The presence of the internet and the ease of accessing it has caused social interaction and communication models to be unlimited by geographical, spatial and time (unlimited) [3], even physical activity in the real world begins to shift and is replaced by digital activities that occur in cyberspace (virtual) [1] so it is not uncommon for commotion in cyberspace to become a trending topic that is integrated with the real world. The world of education is one of the institutions that must quickly update and utilize this technology. Because education is a process carried out by humans to acquire and improve various qualities of skills, skills, and social attitudes [3]. On the other hand education is also an effort to change the behavior of students through a series of exercises and experiences. Thus education must be carried out as a process that lasts a lifetime without being limited by space, time or geographical location [4].

Therefore education in the 4.0 era must be designed to improve the quality of intellectual intelligence and spiritual skills as well as social skills based on the life (life-based learning), which is a development of science and technology that is concentrated for the creation of balance and welfare of human life (human development) [5]. This is where the urgency of increasing information literacy in education is facing the enormity of the flow of cultural and technological disruption 4.0

**2 Method**

This research uses a qualitative approach, which attempt to obtain, collect, process and even analyze and define data qualitatively [6]. This research was conducted through a literature study with its data from library material such as scientific book, magazines, journals, newspapers and even other documents in the form of websites (internet) that contain the information needed. The collected data is then classified and analyzed based on content analysis techniques, which is a data analysis that is carried out carefully, objectively and systematically [7]. The data analysis process uses varied inductive and deductive logic, as is commonly used in qualitative research. So this research is expected to be able to describe as well as discover a new perspective that is comprehensive and intact about website-based educational information literacy systems in the face of the Industrial Revolution 4.0 era.

**3 Results and Discussion**

3.1 Literacy and its Scope

3.1.1 Definition

Literacy comes from the Latin "littera" (letters) which means it involves the writing systems and all the conventions that accompany it [8]. In etymology literacy can be interpreted as literacy or the ability to write and read [9] while terminology literation is a person's ability in terms of writing, reading or certain scientific disciplines that are the expertise of his profession [10]. In the Big Indonesian Dictionary it is explained that literacy is the ability to write and read [11]. This means an individual’s ability to process information and knowledge for his life skills. Therefore in the perspective of scientific, literacy it is often interpreted as information literacy, namely one's ability to access information and use it properly.

Perspectives on literacy are very diverse and broad, depending on the perspective of scientific analysis. Although the substance of literacy is an understanding of reading and writing activities. There are several points of view about the meaning of literacy. Alberta stated that literacy activities are not only limited to reading and writing activities but rather as activities carried out to increase knowledge, skills. So he must think critically, have a solutive spirit in various contexts and communicate effectively and efficiently and even be able to develop his competence and participation in social life. While UNESCO as a world-class educational organization defines literacy as a special skill possessed by someone both cognitive,
psychomotor and affective whose way of acquiring it is not bound by situations and conditions as well as how they acquire these skills. Whereas the National Institute for Literacy places more emphasis on a set of abilities (reading, writing, speaking, calculating and solving problems) as special skills needed in the profession [12]. With the above perspective, the Association of Colleges and Research Libraries (ACRL) defines information literacy as the ability of a person to access, analyze and evaluate and utilize the information obtained effectively.

The discourse on literacy develops so dynamically following the development of science and technology. In this context, there are several types of literacy, including:

a. School Literacy: According to Permendikbud Number 23 of 2015 explains that 15 minutes of reading before learning is a concrete application of the School Literacy Movement (GLS) [13]. Understanding school literacy itself is an attempt by schools to familiarize students in getting and understanding a certain knowledge through reading, writing and listening activities.

b. Environmental Literacy: Environmental literacy is the ability of a person to act and behave properly according to his understanding of the surrounding environment. For example, the ability to analyze the danger of landslides, floods and so on so that with his knowledge and understanding he can take action and anticipatory steps so that they are not affected and even become victims of landslides or floods and so on.

c. Numeration Literacy: Literacy Numeration is a person's ability to use various numbers and symbols and even basic mathematical formulas to solve all problems that arise in everyday life [14].

Meanwhile, according to UNESCO, there are 7 (seven) categories in 21st-century literacy abilities, namely:

a. Basic Literacy (Basic Literacy, in some other registers referred to as Functional Literacy), which is a basic ability that is conventional such as reading, writing and doing numerical calculations and even able to apply it as a form of active participation in social life (family, school and community).

b. Visual Literacy, is a person's skill in understanding and empowering visual competence in his life.

c. Media Literacy, is a person’s ability (knowledge, skills, and even attitudes) in understanding and utilizing various kinds of media (images, sound or video) needed in their lives.

d. Computer Literacy (Computer literacy), is a set of knowledge and skills about the operation of computers (information and communication technology) such as PCs, Laptops, HPs, iPods and BlackBerrys and so on.

e. Cultural Literacy, is one’s ability to understand various traditions and beliefs of a nation, society and socio-religious organizations as well as religious, cultural, ethnic and ethnic symbols that have an impact on the processing and evaluation process of data / information, so as to be able improve the quality of technology and information use in a professional manner.

f. Digital Literacy, is a person's ability to understand and utilize information sourced from various digital computing systems.

g. Network Literacy, is a person's ability to use digital networks proportionally. This literacy is generally applied in the process of learning, courses and training, known as Distance Learning and E-Learning, which is an educational or training activity that uses internet networks such as the widescreen, website, email, and others as a classroom (virtual). In learning distance learning and e-learning interaction and communication between educators and students occurs online so that this process can take place and is carried out anywhere and anytime because the key is uninterrupted internet access [8].
3.1,2 Benefits of Information Literacy
The School Literacy Movement which is being promoted by the government has various benefits among others:

a. Makes it easier to make decisions: In the theory of social science, human being is social creature (zon politicon), so that no one can be free himself from various problems that arise both concerning himself, his family or in society. Therefore humans need a high level of intelligence and high skill to find solutions and solve the various problems they face. Information literacy skills will provide a variety of data and information as a solution to the problems they face. Therefore, in decision making must: (1) formulating the problems that arise (2) gathering information related to the problem (3) using information in making decisions [8].

b. Creating Indonesian human learners: In the era of the industrial revolution 4.0, information literacy is very important because the pillars and bases of life in this era are communication and science and technology skills. The development of information technology (internet) has reduced the limits of time, distance and geography no longer exist. The flow of development of science and information is very strong and takes place very quickly (internet superhighway information). Therefore, information literacy skills will make it easy to get and distribute information in a fast way too. So that the opportunity to read and improve information literacy can make humans as thinkers, writers and observers of social phenomena that continue to develop.

c. Creating new knowledge: The progress of science and technology has presented a new phenomenon namely the access to information very quickly and without limits (unlimited). One indicator of the progress of a nation's civilization is the nation's ability to find, formulate and distribute new knowledge and skills and even develop infrastructure that can facilitate the dissemination and development of knowledge in the future periods [12].

3.2 Industrial Revolution 4.0 (An Analysis)
The Industrial Revolution is defined as a process of change that occurs quickly and the resulting product has a use-value (value-added) and a better sale value (commercial) [1]. Industrial Revolution 4.0 is a mass-production system that is integrated and relies on digitization and automation [24]. Increased data volume, computational power, and connectivity, as well as the emergence of data analysis by the Internet of Things (IoT) or the Internet of People (IoP) which is sourced from interactions humans with machines, are a work pattern and a major feature of the industrial era 4.0, so this era is also called the Era of Disruption Technology [25]. Industry 4.0 as part of an episode of the technological revolution has overhauled patterns and models of human activity on a scale of scope, and complexity and even transformation from previous life experiences. So that humans will live in global uncertainty (global uncertainty) [2]. Therefore humans must have self literacy skills in the form of the ability to predict their future that is changing very quickly.

The emergence of disruption society has brought new values for humans and their civilizations. Various ideas that emerge through artificial intelligence are able to fundamentally change all aspects of human life and even disrupt their culture and civilization, the economic, political, socio-cultural, educational and even religious sectors that were originally manual and experienced digitalization and automation so that humans lose their roles as well as their personalities and even become alienated in their world.

In the context of education, the term disruption education emerges, namely the collapse of the sacredness of the family, school, and community because it is reduced by new forces that do not seem real but can be present anywhere and in any situation [15]. Students have now become a market palace for the production of cyberspace information production which is presented without limits and at very low cost [16]. Various advantages, as well as major challenges, must be faced and constructed into the articulation field of life. Therefore, in Era 4.0, it requires
human resources who have high competence, skills, character, and literacy abilities, so that they can not only exist in the reality of their social life but are also able to provide solutions and even innovations to various disruptions that arise and develop in their lives. This is where the importance of information literacy is to continue to be developed into life skills that can improve the quality of intellectual, spiritual, and social skills [17].

3.3 The Importance of Information Literacy on a Website-Based Education and Its Applications

The emergence of new terms such as eBooks, e-learning, cyber schools, google scholar, on-line learning systems, teacher room applications in educational information technology is a strong signal of the changing demands of learning systems and educational strategies [18]. Therefore the educational paradigm 4.0 demands a fundamental and even comprehensive revolution in the learning system and the implementation of education in general, therefore the main pillars of education 4.0 are computers, the internet, and content [1]. Thus changing educational resources in the form of internet-based digital is strategic steps to bring school life (culture school) beyond the time limit and the available space (unlimited school) [19].

Therefore, increasing the ability of information literacy in education is an inevitable obligation because the era of the industrial revolution 4.0 will reduce our understanding and lead us to a choice of life to change or even become extinct, innovate or lag being blown away by technological progress that is increasingly unstoppable. So that digital learning (digital education) is believed to be better able to provide learning experiences and knowledge even more skills, creative, participatory, and comprehensive skills so that the teacher's function is no longer a source of knowledge. Because that role has been replaced by digital machines that have the sharpness of memory, and extraordinary intelligence beyond human intelligence in general in access information and new scientific more accurate.

Perspectives on education have experienced a very significant shift, initially learning activities focused only on the process of absorption of knowledge (transfer of knowledge and skills) by following the instructions of the teacher/lecturer, focusing on evaluations in the form of tests and cognitive assessments that are very rigid and limited. Whereas in this 4.0 era education is more oriented to self-directed, self-determining which is to develop self-respecting quality behavior by learning independently utilizing unlimited learning resources both in content, space, place and time [20]. Internet networks that are so easy and so cheap are more likely to obtain knowledge even varied and needs-based skills. This is the tendency of learning and
education in the current era of the industrial revolution 4.0 where information technology is the main foundation of human struggles and connectivity with digital networks so that human life spreads so broadly even without limits (borderless).

On the other hand, the paradigm of life-long education (Longlife education) also requires the existence of future education reconstruction efforts (lifelong learning) to foster a strong spirit and culture of literacy (writing, and reading) in social life.

In the Islamic perspective contained the command to read and study natural phenomena. If it is correlated with the current digitalization system of science, it is more accurately described as a culture of information eruption in human life. This statement as stated in the source of knowledge that is Al-Qur’an surah al-Alaq verses 1-5 which means: (1) Read by (mentioning) the name of your Lord Who created, (2). He created man from a clot of blood. (3) Read, and your Lord is the most gracious, (4) who teaches (humans) with the delivery of kalam (5) He teaches people what he does not know.

The above paragraph contains a contextual message that education or educational institutions are required to provide a set of instruments or containers that can facilitate students to develop their literacy skills (reading and writing) including data literacy, technology or cultural literacy. Therefore the availability of networks or web-based education literacy links "becomes one of the ideas or ideas that must be immediately responded positively and applied in every educational institution [21]. This web-based education literacy link is intended to facilitate students' skills and skills in reading and writing even in accessing and using information effectively. Therefore the education literacy website must contain special content about the entire education system even about advanced scientific information and cross-interest skills. And currently, there are 10 web-based online learning sites to upgrade knowledge and skills such as; Brainly, Udemy Teacher's room, Canva Design School, Cozora and others. Below is an example of the coverage of an education literacy website with all its menu.

| Table 1: Coverage of Educational Literacy Websites in the Digital Age 4.0 |
|---------------------------------|---------------------------------|
| No | Education Literacy Website Coverage | Information |
|----|-----------------------------------|-------------|
| 1 | Website about school / campus information and profiles (institutions and foundations) | School / campus information / school profile/campus, Teaching Learning Process Schedule, Banking information, canteen, availability of other facilities, Institutional management system, Other administrative services |
| 2 | Website about Material Resources | The main package / reference books, Learning module, Student Worksheets / practice exercises along with the workmanship formula, Journals, Supporting reference books etc. |
| 3 | Website about Science and Skills Development | Information on further education, Guidance for certain skills, Job vacancy information etc. |
| 4 | A website about cross-cutting knowledge and skills | Information about other scientific disciplines, Other skill discipline information, Job vacancy information |

Table 2: Website Design Education Literacy in the Industrial Era 4.0 [4]
| No | Description | Features / content |
|----|-------------|--------------------|
| 1  | Use Case    | Admin              |
|    |             | User               |
| 2  | Mockup      | Home               |
|    |             | Information menu / profile of the institution |
|    |             | Material resource menu |
|    |             | Internal and External Menus |
|    |             | Comment menu       |
|    |             | Other features     |

**Table 3:** Specifications of the devices used [20]

| No | Device Type                | Information                      |
|----|-----------------------------|----------------------------------|
| 1  | Computer PC / laptop        | Intel Processor or celeron       |
|    |                             | RAM 1 – 4 GB                    |
|    |                             | HD 250 – 500 GB                 |
|    |                             | Software                        |
|    |                             | Microsoft Windows 10            |
|    |                             | Google chrome                   |
|    |                             | Etc                             |
| 2  | Android phones of all brands| apple com                       |
|    |                             | Samsung                         |
|    |                             | Oppo                            |
|    |                             | Xiomi                           |
|    |                             | Etc                             |

Information:

a. This website can be designed and created by IT experts who want to develop the quality of education in general so that the copyright and legality of the product become a patent designer.

b. This website requires its browse process so that it will restrict anyone who will enter/login and simplify the process of control through the login system that can facilitate the admin in tracking his users (users).

c. This website will be protected by Copyright, as a copyrighted work whose copyright is only owned by the designer himself, thereby reducing the possibility of plagiarism or improper conduct.

4 Conclusion

The development of information technology in the industrial era 4.0 has a positive impact on the world of education. The concrete form is that educators and students can access knowledge and skills easily and quickly without being limited to space and time through a website-based literacy system and application. Until now there are already 10 more online learning applications that can be accessed by educators and students in upgrading science and skills. The various sites include: Teacher's room, Khan Academy, edX, Brainly, Udemy, Cozora, Coursera and others.

The presence of various scientific breakthroughs, literacy skills or expertise based on digital technology in the 4.0 era, then access to information and knowledge occurs quickly without any place and time limits. To deal with this system, education must:

a. Adjusting to the climate or information technology trends that continue to develop massively and competitively

b. Formulate a new curriculum and technology-based learning system (online system)
c. Prioritizing accelerating steps in realizing participants’ skills and soft skills (human literacy) that will sustain and underpin technology-based information literacy skills

d. Design a website-based information literacy system (application) that is compatible with technology systems such as Android or computers that are currently developing.

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