The Development of the Sub Instruments of Digital Literacy on the Subjects of Electronics Circuit in Vocational School

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ABSTRACT

In this study has the objective to develop sub instruments digital literacy of subjects of electronics circuit in vocational school students. The resulting sub instrument is used to measure the competency of students with the three domains such as affective, cognitive, and psychomotor. This study uses the method of scientific studies obtained from some research experts, so that by scientific experts that can be developed into a sub instrument that is used in vocational schools as an assessment of the competence of the students. This research resulted in several indicators as much as 3 kinds of skills, the first indicator produces 3 categories of capabilities, indicators that both produce 3 categories of ability, the third indicator get 3 categories of ability and indicators fourth produce 3 categories; while in developing the sub instrument obtained 10 sub instruments that will be used in measuring the competence of vocational school students.

Keywords: Digital literacy, competency, sub instrument

1. INTRODUCTION

Digital literacy emerged since 1990, one of the figures that Gilster defines that literacy digital as an ability to understand and use information from a variety of digital resources [1]. Gilster breaks it down into four core competencies that need to be owned by someone so it can be said digital literacy includes: (1) Search on the Internet (Internet Searching). (2) Guide the direction of the hypertext links (Hypertextual Navigation). (3) the Evaluation of the information content (Content evaluation). (4) the Preparation of knowledge (knowledge Assembly). [2]. In his book Gilster also clarified that this competence as an ability to collate knowledge, to build a collection of information obtained from a variety of sources with the ability to collect and evaluate fact and opinion as well as without prejudice. This is done for the benefit of certain better education and jobs. This competence includes several components, namely: (1) the ability to search information through the internet; (2) the ability to create a personal newsfeed or notification of the latest news that will be obtained by means of join and subscribe to news in a newsgroup, mailing list or discussion group the other a discuss or discuss a particular topic in accordance with the requirements or the topic of the problem specific; (3) the ability to perform a crosscheck or re-check against the

information obtained, (4) the ability to use all types of media to prove the truth of the information, and (5) the ability to compile the source of information obtained on the internet with real life that is not connected with the network [2]. In general, has a meaning that digital literacy is the ability to get in touch with information hypertextual in the sense of reading sequential or non-sequential computer assisted [4]. Digital literacy the longer the experience the development of the technology, with the development of the push for changes in the meaning of the concept of literacy itself. Digital literacy refers to the ability in reading, writing a text and the ability to interpret a concept of information, one of which is digital literacy. The term digital literacy is gaining popularity around 2005, digital Literacy meaning the ability to get in touch with information hypertextual in the sense of reading not a sequential computer assisted.

The term digital literacy is never used 1980s [5]. Other authors use the term digital literacy to demonstrate a broad concept that links together a variety of literacy-relevant and literacy-based competence and skills of communication technology, but stressed on the ability of the evaluation information necessary that in supporting is knowledge together with the understanding and attitude [6]. Tower and Bartlett have divide some variable on the intellectual processes related to digital literacy into three

categories include: (a) search for and use digital content, (b) creating digital content, and (c) communicating digital content [7]. An action that is both in terms of content and attraction on the visual appeal to students and becomes a necessity for students in the teaching and learning with the use of online media [8]. Digital literacy for students required some competence, among others: (1) skills operate the; (2) thinking skills; (3) skills in collaboration; and (4) skills awareness [9].
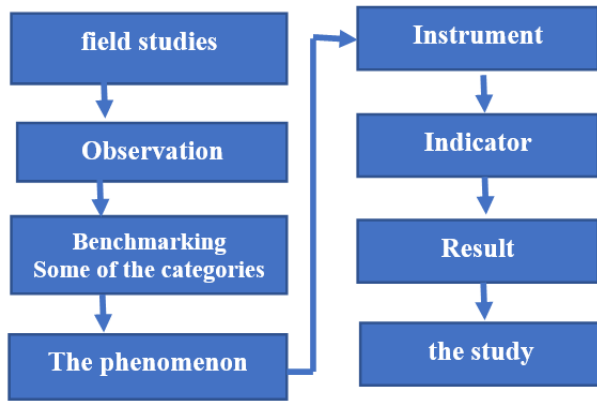
The study of digital literacy have been done by some experts in the international sphere such as America, Europe, Australia, Asia to Africa and some of the figures, among others: David Bawden, Gloria E. Jacobs, Sonia Livingstone, Guy Merchant, up to Ezter Hargittai. This shows that the field of digital literacy interesting enough so that pushing experts to cooperate in developing the study of digital literacy [10]. Asosiasi Penyelenggara Jasa Internet Indonesia (APJII) explains that the development of the internet in Indonesia at this time showed a positive impact. The results of the APJII 2017 survey noted the increased use of the internet in Indonesia of 132,7 million in 2016, jumped to 143,26 million from a total of 262 million people in Indonesia. APJII from 2014 to 2019 will develop a wide band Indonesia so that the country can enjoy internet with a speed of 10 Mbps and 20 Mbps for urban communities [11].

According to some author it can be concluded that digital literacy includes not only reading ability, but also needed a process of thinking critically to evaluate the information found through digital media. The competence of digital literacy useful for dealing with information from a variety of digital resources continues to grow along with the development of information and communication technology as the impact of the phenomenon of media convergence. New Media referred to specifically in the digital media-based internet or the world wide web (www). The emergence of in an internet is what ultimately motivates the realization of the acceleration of the development of an information. It is associated with some characteristics of the internet that can collaborate information from several parts of the earth so that in the distribution of information can be done easily and quickly. Through internet one can easily search information by utilizing digital media it has without any limitation of distance and time, adult internet users is increasing from year to year. Based on several studies it can be known that the topic of research on digital literacy has become a topic of research by the experts at foreign and domestic in an effort to determine the literacy skills of a particular group of people in relation to its interaction on the digital media developed at this time. Thus the development of digital literacy at the moment is very "soft" the improvement and of the some competence in the world of education in this vocational school. In vocational schools there are subjects of electronics circuit.

On these subjects require digital media as a support in the mastery of insight for students to understand to be able to implement something the results are beneficial to everyday life, such as making a digital clock, running lights, messages in the form of text, and others. Electronics in it learn about logic gates (AND, NAND, OR, NOR, NOT, EX-OR, EX-NOR), electronics combination (combining of several logic gates in an electronic output to produce a digital clock, counting the back-and-forth, running lights, the messages can be displayed in the form of text, and others). Therefore, in improving the competence of students to electronics circuit required a digital literacy using the internet. In measuring the competence of students on the subjects of electronics circuit is required of an sub instrument. As for the in developing the sub instruments needed some of the indicators first, the indicators describe some of the aspects and then draw up an sub instrument. In general students are expected to have three realm includes: realm of the affective, cognitive and psychomotor. From the third realm that will be used as assessment of competence of students. So from the third of these domains can be developed into three categories. These categories include: skills, skills in thinking, skills in cooperation and skills in reasoning. So from each of those indicators can be described, among others: (1) the ability to understand and use the information; (2) the ability to find information; (3) the ability to convey the information; (4) the ability to analyse information; (5) the ability to evaluate the information; (6) ability to develop creativity; (7) the ability to build cooperation within the team; (7) the ability to build a network of information; (8) ability to exchange ideas knowledge information; (9) the ability in maintaining the values associated with information technology; (10) the ability to evaluate the correctness of the information; and (11) ability to keep himself in receiving the information.

2. METHOD

Data collection methods the basic theory of this is done with the field study, observation, comparison between the category, phenomena, and situations based on various assessments, such as the study of inductive, deductive, and verification on an indicator to obtain data which is used as an sub instrument. Of several indicators to produce some of the sub instruments that will be used as a result in the research. The research method can be seen in figure block diagram the following:

Figure 1 Research steps

Field studies is one method of data collection in qualitative research which does not require in-depth knowledge of the literature used and the specific

3. RESULT AND DISCUSSION

From the description on some of the experts have to get the indicator consists of: (1) the ability to understand and use the information; (2) the ability to find information; (3) the ability to convey the information; (4) the ability to analyze information; (5) the ability to evaluate the information; (6) ability to develop creativity; (7) the ability to build cooperation within the team; (7) the ability to build a network of information; (8) ability to exchange ideas knowledge information; (9) the ability in maintaining the values associated with information technology; (10) the ability to evaluate the correctness of the information; and (11) ability to keep himself in receiving the information. Some of the indicators can be translated into a lattice sub instrument digital literacy on the subjects of electronics circuit at a vocational school. From the development of the sub instrument that is produced can be used as an sub instrument of competence of the subjects of electronics circuit in vocational school students. The results of the development of the grating of the sub instrument can be seen in the table 1. Of the indicators of skills can be described into 3 kinds of and produce the 19 sub instrument, while the indicator of skills in thinking produce 10 of the sub instrument. capabilities of the researchers [12][13]. Field studies done to decide the direction of research based on the context [12]. In field studies conducted outdoors. Observation was done to find out something from some cases in accordance with the knowledge as well as ideas on an idea. In accordance with the knowledge or ideas that have been observed previously, and to get some necessary information useful to continue in a study. The process in the search for or get some information that is objective, real and can be accounted for. After doing field studies and observation then the next do the benchmarking that has been obtained from some of the categories that produce a phenomenon. Then of some such phenomena perform studies related to the research.

From the results of these studies do verify to get some of the indicators that will be used as sub instruments. The resulting sub instrument is used to measure the competence of vocational school students on the subjects of electronics circuit.

Table 1. Sub instrument development digital literacy

Indicator	Description	Sub instruments
Skills operation	The ability to understand and use information	1. Students are able to understand logic gates (AND, NAND, OR, NOR, NOT, EX-OR and EX-NOR) on DSCH2 2. Students are able to understand in reading the truth table on DSCH2 3. Students are able to understand software functions DSCH2 by using logic gates 4. Students are able to use software functions DSCH2 the logic gate
	The ability to find information	1. Students are able to search for your account and download the software DSCH2 on the internet quickly and easily 2. The students were able to perform the installation of the program DSCH2 on the computer 3. Students are able to use the information/ icon in the program DSCH2 4. The students were able to display the work screen to draw logic gates in DSCH2 5. The students were able to connect the image gate of the logic program DSCH2 6. The students were able to run the electronics logic gates on the program DSCH2 7. The students were able to display the timing diagram in electronics a logic gate by using the program DSCH2 8. Students are able to make electronics a combination of logic gates into the program DSCH2
	The ability to convey information	1. Students are able to explain how to track the account the supporting electronics circuit in the form of software DSCH2 2. Students are able to explain how to perform the installation of the program DSCH2 on the computer 3. Students are able to explain some of the icon on the program DSCH2 4. Students are able to explain how to display the work screen to draw logic gates in DSCH2 5. Students are able to explain how to demonstrate electronics logic gates on the program DSCH2 6. Students are able to explain how to read timing diagram of the gate logic uses the DSCH2 7. Students are able to explain how to make electronics a combination of logic gates into the program DSCH2
Thinking Skill	The ability to analyze information	1. Students can design using the schematic to a symbol on one of the logic gates (AND, NAND, OR, NOR, NOT, FULL ADDER, amd other) by using the program DSCH2 2. Students can connect the I/O to display a list of pins I/O form button, clock, LED 3. Students can change the input on the logic gate in accordance with the truth table 4. Students can conclude the results of the electronic gate into the truth table 5. Students can conclude the results of the electronic gates in the timing diagram that there is on the program DSCH2
	The ability to evaluate information	1. Students can assess the correctness of image electronics gate with truth table (Routh table) and on the program DSCH2 2. Students can analyze the logic gates (AND, NAND, OR, NOR, NOT, EX-OR and EX-NOR)
	The ability to develop creativity	1. Students can create electronic combination with a variety of logic gates according to the needs of day-to-day 2. Students can create an electronic clock using logic gates on the program DSCH2 3. Students can make electronics running lights

4. CONCLUSION

Based on the results of the analysis in the development of the sub instrument the subjects of electronics circuit in a vocational school can be summarized as follows: (1) in preparing the indicator produces 3 kinds of skills; (2) in describing the first indicator produces 3 categories of capabilities, indicators that both produce 3 categories of ability, the third indicator get 3 categories of ability and indicators fourth produce 3 categories; and (3) in developing the sub instrument obtained 10 sub instruments that will be used in measuring the competence of vocational school students.

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