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Student Literacy Towards Math Problem Solving Reviewed from Online Addiction Level Games

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Abstract. Literacy skills include observing, processing, and evaluating problems. In addition, the development of technology creates a phenomenon of online games that are rife in students. This study aims to find out students' literacy towards solving math problems reviewed from online addiction level games. Four participants were selected from thirty-two students. Two students are addicted to online games, and two students are not addicted to online games. Test instruments and interview guidelines were used in this study to obtain student literacy. The results showed that students' literacy process of math problems addicted to online games is less able to be done well and tends to be hasty; some stages are still not appropriately met. Meanwhile, in students who are not addicted to online games, the literacy process goes well so that the steps of the literacy process are carried out in a systematic, and students can maximize the time in problem-solving.

Keywords: Addiction to online games, literacy, math problems.

INTRODUCTION

Literacy is the ability to access, understand, and use things intelligently through various activities, such as reading, seeing, listening, writing, and speaking. Literacy skills support the student's self-understanding process and demonstrate the ability to interact, communicate, even the ability to express something verbally and in writing [1][2]. To improve the School Literacy Movement (GLS), several guidelines related to this have also been published in 2016 by the Ministry of Education. Nevertheless, Joyo [3] explained that literacy skills had not produced maximum results because of the low awareness of student and teacher literacy.

Literacy is a necessity that humans need as the basis for lifelong learning, which covers various aspects of life [1][4][5]. Mathematical literacy is an individual's ability to formulate, apply, and interpret mathematics in various life contexts. Capabilities include mathematical reasoning and mathematical concepts, procedures, facts, and tools for describing, explaining, and predicting phenomena. These abilities help individuals recognize the role of mathematics in the world and make judgments on the nature of constructive decision-making, related and reflection of citizens [4]. ati, Muhtarom, & Sugiyanti [6] suggests that the stages of the mathematical literacy process are identifying mathematical aspects of a problem context in real life and identifying known variables; determining mathematical models and simplifying problems; designing and applying strategies to find solutions; determining mathematical facts,

procedures, algorithms, and models when searching for answers; reflecting, describing and determining mathematical outcomes; interpreting mathematical results and evaluating mathematical solutions into real-life contexts. Literacy skills are very influential to the success of students in learning. With good literacy, students can understand spoken text, writing, and images [7].

In addition to literacy skills that become an essential discussion in this modern era, there are also various phenomena of technological advancement. One of the obvious is that many students are online game addiction. Online game addiction has been reports of its impact on several aspects of life, including health, psychologically, academically, socially, and financially [8][9]. This is in line with Zhang, Qin, & Ren [10], which states that there is a significant negative relationship between online gaming addiction and learning achievements. If the variable score of online gaming addiction increases, then the learning achievement variable score will decrease.

Conversely, if the variable score of online gaming addiction decreases, then the learning achievement variable score will increase. The danger of the phenomenon of online gaming addiction is that the behavior of playing online games continues to be repeated and habituated so that the dopaminergic pathways in the brain will strengthen and settle to cause dependence [11][12]. Eventually, it will reinforce the reactive system and weaken the reflective system to decrease its cognitive abilities. Kusumadewi [13] said that someone addicted usually uses 2 -10 hours per day to play online games. This was also used by Kusumawati, Aviani, & Molina [14] as a reference in her research related to the difference in the level of addiction to online games. The duration of playing online games is less than 2 hours is categorized as low level, duration between 2 - 10 hours has been classified as medium level, and playing online games for more than 10 hours in the space of a week is categorized as high level. Playing online games for more than two hours per day is a form of addiction [15]. Based on the description above, then problem formulation in this study is how the literacy of math problems by students who are addicted and who are not addicted to online games solves math problems?

RESEARCH METHOD

The method was used in this study is descriptive qualitative. Questionnaires are given to students to see the level of addiction of students to online games. Indicators of online gaming addiction, among others; compulsion, which is the urge to perform continuously; withdrawal, i.e., difficulty to withdraw or distance yourself from things related to online games; tolerance, tolerance here is related to time, where an online gaming addict can't stop playing before feeling satisfied; interpersonal and health-related problems, related to interactions with others and also health problems. The results showed that as many as four students stated that dating was playing online games, and twenty-eight students were not addicted to playing online games. A total of four students were selected as respondents to the study, namely two students addicted to online games (RAW and SRD) and students addicted to online games not addicted to online games (ASA and NWK). Data collection is conducted with written tests related to the material of The Two-Variable Linear Equation System and interviews related to the literacy process of mathematical problems with indicators, including: 1) formulating problems systematically; 2) apply concepts and procedures; and 3) apply, and evaluate the calculation results. Source triangulation is used to obtain the validity of research data. The results were analyzed using data reduction techniques, data presentation, and withdrawal of research conclusions [16].

RESULT AND DISCUSSION

Literacy Process for Students Addicted to Online Games

The results of written work and interviews show that raw and SRD subjects have not formulated problems properly. Both subjects can understand the problem but have not been able to identify known variables in the problem. Subjects are not able to create mathematical models of literacy problems given but can simplify problems. It appears that the subject is less able to formulate the problem systematically. This is seen when the subject can write down the information obtained by understanding the problem. Subject writes down the information obtained from the situation by creating a table. The subject wrote this because there was a memorandum showing the purchase of a notebook and a ballpoint by two students at the school cooperative. The message only showed the total price of the purchase of the two items. But in the answer also indicates that the subject is less able to make mathematical models. Figure 1 obvious that shows the result of written work on the subject of SRD.

FIGURE 1. SRD Subject Results in Formulating Problems

The results of written work and interviews show that both subjects cannot apply facts, concepts, procedures, and reasoning well and logically in finding solutions to problems. The subject does not use that mathematical concept. In finding solutions or problem solving is done with mathematical procedures that are not systematic. Figure 2 obvious shows that SRD subjects cannot apply the right concept to find a solution to a given question. Compared to using the concept of elimination and substitution to the linear equation of two variables, that should be done. Subject prefers an instant way that it guesses randomly on a given question. The subject's answer also indicates the absence of a mathematical model is created.

FIGURE 2. SRD Subject Results in Applying Concepts and Procedures

Both subjects were able to apply and evaluate the calculation results well. The subject is able to make a final settlement or conclusion of the answer from the question. The interpretation of the problem and the application of calculations have been made well. For example, Figure 3 shows that the subject of SRD is able to apply and evaluate the calculation results because it can already make a settlement or provide a conclusion answer to the question given.

FIGURE 3. SRD Subject Results in Evaluating Calculation Results

Literacy Process for Students Who Are Not Addicted to Online Games

The results of written work and interviews show that ASA code and NWK subjects are able to formulate problems systematically and well-constructed; it appears that the subject can recognize the problem and identify known variables and asked well, can also write them as part of the composition of the answer. Subjects can create mathematical models of literacy problems given as well as simplify problems. Figure 4 shows that the scoffer can write down what is known in the question and each question point. Student A bought three books with two pens for Rp 13,000 and student B bought two books with three pens for Rp 12,000 well written. The subject wrote this because there was a memorandum showing the purchase of a notebook and a ballpoint by two students at the school cooperative where the memorandum only showed the total price of the purchase of the two items. Subjects are able to create mathematical models by dissociation of variable x as a book and variable y as a pen. Then the ASA subject creates a linear equation of two variables from the identification of the problem, namely, $3x + 2y = 13,000$ and $2x + 3y = 12,000$.

FIGURE 4. ASA Subject Results in Formulating Problems

Both subjects are able to apply facts, concepts, procedures, and reasoning well and systematically finding solutions to problems. The subject applies the appropriate mathematical concepts and seeks solutions with routine mathematical processes. Figure 5 as clearly that the subject can use the right idea to find an answer to the given question by applying the concept of elimination and substitution to the linear equation of two variables. The acquisition of variables x and y also demonstrates the subject's ability to apply facts in solving problems.

FIGURE 5. ASA Subject Results in Applying Concepts and Procedures

Both subjects were able to apply and evaluate the calculation results well. The subject is able to make a final settlement or give the conclusion of the answer to the question. Figure 6 is precise that the subject is organized to the point of final completion or provides a decision to the answer to the question given.

$$c. \quad 5x + 5y = 5(3000) + 5(2000)$$
$$5x + 5y = 15000 + 10.000$$
$$5x + 5y = 25.000$$
$$\therefore harga \; dari \; 5 \; buku \; dan \; 5 \; pulpen$$
$$adalah \; 25.000$$

FIGURE 6. ASA Subject Results in Evaluating Calculation Results

The results showed that 4 out of 32 (12.5%) students who were respondents to the study belonged to the online gaming addiction group. This is in line with the results of research Novrialdy [8] which states that 10.15% of adolescents in Indonesia are indicated to experience second-hand online gaming. Concluded also that students with addiction to online games are only able to meet some indicators of the stages of the mathematical literacy process. Students give answers faster than deadlines, the answers given are not maximal enough with less precision. This aligns with Zhang, Qin, & Ren [10] states that online gaming addiction is related to learning achievements because online games make students accustomed to dynamic stimuli. There are exciting things that can be taken from students who are addicted to online games. Although the problem solving is less systematic, students with online gaming addiction have a good side in evaluating the calculation results. The tendency to think is widely demonstrated by the existence of problem work solutions through alternative means and more focused on the correct end result. The point of view is focused on one standard way, showing the creative side of students in solving problems. This is also in line with Ulya & Wardono [5], which suggests that playing online games can develop a more creative way of thinking for students. Creative is the ability to find solutions in other ways. Meanwhile, students who are not addicted to online games can already fulfill every stage of the literacy process. Students is more disengaged with online games so tend to be hasty in learning. Students who are not addicted to online games systematically systematically [6][7].

CONCLUSION

Student's literacy addiction to online games in solving mathematical problems still do not meet the indicators of formulating problems systematically and applying concepts, procedures, and reasoning. However, students are able to meet the indicators using and evaluating the calculation results. Students who are addicted to games tend to be hasty and less thorough in solving math problems. In comparison same time, students who are not addicted to online games in solving mathematical problems are able to do every stage of the literacy process against math problems well. Students and show thoroughness in solving math problems. Students in an organized, clear, and accurate way of gathering information, applying concepts, procedures, doing calculations, and concluding answers well. Thus, it is recommended that people who are addicted to online games need to develop a literacy process against math problems and perform every stage of the literacy process. There is no harm in playing online games, but with reasonable limits, online games are precisely good for developing student reasoning.

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