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by Yanuar Murtianto

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Semarang, Indonesia
11 August 2021

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AIP Conference Proceedings, Volume 2577
Proceedings of the 6th National Conference on Mathematics and Mathematics Education

Table of Contents

Preface: The 6th National Conference on Mathematics and Mathematics Education (SENATIK) 010001
Committee: The 6th National Conference on Mathematics and Mathematics Education (SENATIK) 010002

MATHEMATICS

Homomorphisms and $(\lambda, \mu]$ – Fuzzy subgroup
Saman Abdurrahman 020001

Analysis of scientific learning using interactive videos on mathematics communication ability of students of SMP N 05 city of Bengkulu
Padila Akbar, Fatrima Santri Syafri, Nur Salamah, Maryani, Sintia Lorenza, and Herawati 020002

Mathematic connection analysis of students in completing linear programs based on mathematics ability
Anggraini, Cahyani Rahmadani Dj Hanusu, and Muh. Hasbi 020003

Implementation of reciprocal teaching models to increase the capability of mathematical creative thinking skills
Lilik Ariyanto, S. Supandi, Widya Kusumaningsih, and Putri Novitasari 020004

Analysis of students' mathematical reasoning ability using connecting, extending, review (CER) learning model
Andi Muhammad Irfan Taufan Asfar, Andi Muhamad Iqbal Akbar Asfar, and Andi Nurannisa 020005

Making ethnomathematics-based learning videos
Abdul Aziz and Iswahyudi Joko Suprayitno 020006

Geometric thinking profile of deaf middle school students based on van hiele level during the Covid-19 pandemic
Ni Kadek Dianita, St. Budi Waluya, and Walid 020007

Reflective thinking in solving number theory problem: A case study of pre-service teacher in terms of cognitive style
Widya Dwiyanti, Stevanus Budi Waluya, and Walid 020008

The effect of gender on mathematical communication skills in geometry and measurement materials
Aulya Fajarwati, Fatrima Santri Syafri, Amelia Lestari, Betia Ningsih, Yusmia Rika Subekti, and Cicik Paramis Wari 020009

Difficulty analysis of solving mathematics materials of counting fraction number operating students class B Public Alementari School 04 Lubuk Pinang, Mukomuko Regency
Fatmi, Poni Saltifa, Suharli Sila Putra, Sintia Hikma Nirmal, Velya Vitaloka, and Lola Anggun Nopela 020010

Development of learning media microsoft powerpoint based on visual basic for application (VBA)
Moch. Fauzi and Lukman Jakfar Shodiq 020011

Mathematics thinking process of student's in spatial visual intelligence through transcript based learning analysis method
Ferry Ferdianto, St. Budi Waluya, and Nuriana Rachmani Dewi 020012

Analysis of students mathematical creative thinking ability in terms of self confidence in complex variable function courses
Gunawan, St. Budi Waluya, and Nuriani Rachmani Dewi 020013

Secondary mathematics teachers' ability in solving PISA-like mathematics problems
Tria Gustiningsi, Ratu Ilma Indra Putri, Zulkardi, and Hapizah 020014

Teaching mathematics online: Studies focusing on student mathematical communication
Hilda Hakim and Hilliyani 020015

Mathematical connection ability of male students
Nurina Happy, Puput Diyan Pratiwi, Rina Dwi Setyowati, Sutrisno, and Dhian Endahwuri 020016

Analysis validity and reliability of monitoring and evaluation final examination: Mathematics I in Computer Engineering Study Program
Harizahayu, Muhammad Fathoni, and Koko Hermanto 020017

Predator-prey dynamical model with infected prey by virus and its optimal control using pesticide
Teguh Herlambang, Dinita Rahmalia, Nur Aini, and Denis Fidita Karya 020018

Implementation of H-infinity and ensemble Kalman filter for whole blood (WB) estimation in PMI Bojonegoro
Teguh Herlambang, Abdul Muhith, Irhamah, Mohamad Yusak Anshori, Dinita Rahmalia, and Denis Fidita Karya 020019

Analysis of factors affecting decisions to purchase Kre Alang products in Sumbawa Regency using structural equation modeling
Koko Hermanto, Salman Altarisi, Silvia Firda Utami, Ryan Suarantalla, and Nurul Hudaningsih 020020

Analysis of differences in word-of-mouth factors for UTS students based on gender identity using a structural equation model
Koko Hermanto, Nora Dery Sofya, and Harizahayu 020021

DIF content of math test on learning assessment in elementary school
Herwin 020022

Students' adaptive reasoning in solving geometrical problem
Yeni Heryani, Sri Tirto Madawistama, Stevanus Budi Waluya, and Nuriana Rachmani Dewi 020023

Problem solving ability and belief in prospective mathematics teachers
Nurina Hidayah, St. Budi Waluya, and Walid 020024

Maximum turning point and final spread of COVID-19 in. Indonesia: An analysis of trends and data patterns
Malik Ibrahim, Anisah, Wita Ratna Puspita, Rody Satriawan, Lalu Jaswandi, Aminullah, Johri Sabaryati, and Syaharuddin 020025

Designs of worked example to facilitate retention and transfer capability in derivatives of algebraic functions
Nur Irfani and Endah Retnowati 020026

The effect of learning style on problem solving strategies of prospective mathematics teachers
Dwi Juniati and I. Ketut Budayasa 020027

Effect of computer technology in mathematics learning: A meta-analysis
Filomena M. Kamalera, Gratiae V. Bleveni, Christine K. Ekowati, and Damianus D. Samo 020028

The stage of analysis, design, and development in the junior high school learning videos developed to strengthen mathematical reasoning
Kartinah and Dina Prasetyowati 020029

The impact of beliefs on motivation and mathematical problem-solving in prospective teacher with different personality types
Annisa Dwi Kurniawati, Dwi Juniati, and Abadi 020030

Problem-solving with Geogebra: How the relationship between reasoning and communication in mathematics
Dedek Kustiawati and Nurfadilah Siregar 020031

Designing hypothetical learning trajectory for lines and angles using Central Java traditional house context
Widya Kusumaningsih, Hartono, and Farida Nursyahidah 020032

Enhancing students' achievement in math word problems through reading comprehension and learning motivation
Merry Lapasau, Virgana, Soeparlan Kasyadi, Ira Mayasari, and Apriani Riyanti 020033

Improving mathematical adaptive reasoning through traditional game "Lojo-Lojo Pindip" based on Android
Magfirah, Andi Muhammad Irfan Taufan Asfar, Andi Muhamad Iqbal Akbar Asfar, Sugian Nurwijaya, and Andi Fauziah 020034

Montessori method to stimulate mathematical communication skills in mild intellectual disability students
Arif Muchyidin and Nanang Priatna 020035

Comparison of students' mathematics critical thinking skills through the use of learning management systems and whatsapp groups in online learning
Muhtarom, Muhammad Saifuddin Zuhri, Bambang Agus Herlambang, and Yanuar Hery Murtianto 020036

Application genetic algorithm to improve transportation problem of cement distribution using Artificial Bee Colony
Siti Mujanah, Mohamad Yusak Anshori, Dinita Rahmalia, and Teguh Herlambang 020037

Improvement habits of minds in constructing mathematical proof using DNR-model
Abdul Mujib and Firmansyah 020038

The effect of independent learning on creative thinking ability in mathematics during the Covid-19 pandemic other students of Bengkulu Tadris Mathematics
Lailatul Mukaromah, Fatrima Santri Syafri, Devi Setiowati, Apriliza Dotari, Debby Syntia Monica, and Nia Kurniawati 020039

Student literacy towards math problem solving reviewed from online addiction level games
Yanuar Hery Murtianto, Muhtarom, Bambang Agus Herlambang, Sutrisno, and Riza Oktavia 020040

Task instrument that support children's gesture with special needs learning mathematics
Sriyanti Mustafa, Baharullah, and Vernita Sari 020041

Analysis of productive thinking characteristics students in the proofing of limit functions
Nizaruddin, Sutrisno, Yanuar Hery Murtianto, Muhammad Saifuddin Zuhri, and Muhtarom 020042

Signal analysis with continuous wavelet transform
Lambang Wahyu Nugroho and Dewi Retno Sari Saputro 020043

Integration of Bugis-Makassar ethnic traditions sulapa Eppa Walasuji in developing logical-mathematical intelligence of students based on Android applications
Andi Nurannisa, Andi Muhammad Irfan Taufan Asfar, Andi Muhamad Iqbal Akbar Asfar, Adji Syaifullah, and Nurlinda 020044

Integration of Sigajang Laleng Lipa ritual in learning to improve high order thinking skills (HOTS) based on students' mathematical problem solving
Nurlia, Andi Muhammad Irfan Taufan Asfar, Andi Muhamad Iqbal Akbar Asfar, Murasyidah Masri, and Tri Puspita Sari 020045

Set covering location problem and P-median problem model in determining the optimal temporary waste disposal sites location in Seberang Ulu I sub-district Palembang
Sisca Octarina, Fitri Maya Puspita, Siti Suzlin Supadi, Rizma Afrilia, and Evi Yuliza 020046

Didactic design to improve mathematical reasoning ability of high school students on derivative application materials
Wulan Resti Oktaviani, Tatang Herman, and Darhim Darhim 020047

High logical-mathematical intelligence learner's problem-solving performance on integer operation problem
Pathuddin, Linawati, Mubarik, Fadlun, and Anggraini 020048

Developing group theory textbook which connected to the school mathematics' contents
Agnita Siska Pramasdyahsari, Rina Dwi Setyawati, and Maya Rini Rubowo 020049

Mathematical model of information service pricing scheme based on utility functions of constant elasticity of substitution
Fitri Maya Puspita, Melisa Ulina, Evi Yuliza, and Sisca Octarina 020050

Profile of statistical problem-solving ability based on the mathematical disposition
Ratri Rahayu, Kartono, Dwijanto, Arief Agoestanto, St. Budi Waluya, and Nuriana Rachmani Dewi 020051

Massallo kawali tradition integrated in open time learning model improving students' flexible thinking ability
Andi Sri Rahayu, Andi Muhammad Irfan Taufan Asfar, Aisyah Nursyam, and Andi Muhamad Iqbal Akbar Asfar 020052

Strategic competence in solving-problem and productive disposition of high school students based on cognitive styles
Muhammad Syarifuddin Rahman, Dwi Juniati, and Manuharawati 020053

Design of virtual reality-based mathematics learning media on trigonometry material in senior high school
Noviana Dini Rahmawati, Achmad Buchori, and Muhammad Hafidz Azizal Ghoffar 020054

Visual representation in solving mathematics problems
Mohamad Rif'at, Nilamsari Kusumastuti, and Nurfadilah Siregar 020055

Backpropagation neural network weight training using particle swarm optimization
Mohammad Iqbal Haidar Romadloni and Dewi Retno Sari Saputro 020056

Improving the critical thinking ability of junior high school students through realistic mathematics education innovation
Asri Ode Samura, Darhim, Dadang Juandi, Arwan Mhd. Said, Karman La Nani, and Maximus Tamur 020057

Stress level analysis of students on online mathematics course
Rospala Hanisah Yukti Sari and Dwi Sari Usop 020058

Exploration of mathematics teacher knowledge in lateral thinking techniques to develop creative thinking skills
Lukman Jakfar Shodiq, Puji Savvy Dian Faizati, and Bendot Tri Utomo 020059

Analysis of silent students mathematical communication based on mathematics anxiety
Zahid Abdush Shomad, Fadhilah Rahmawati, Budi Waluya, and Walid 020060

Mathematics pedagogical knowledge for slow learners teaching
Mukti Sintawati, Hanum Hanifa Sukma, and Arita Marini 020061

Mathematical creative thinking ability in solving social arithmetic problems in terms of the adversity quotient
Sri Solihah, St. Budi Waluya, and Nuriana Rachmani Dewi 020062

Student's mathematic communication ability review from student achievement motivation
Sugianto, St. Budi Waluya, and Nuriana Rachmani Dewi 020063

Analysis of students' metacognition in solving mathematics problem
Mega Suliani, Dwi Juniati, and Agung Lukito 020064

Integration of local culture of Bugis-Makassar tribe A'bulo Sibatang, Assamaturu, Mappesabbi, Sipakatau based on Android to improve mathematical connection ability
Sumiati, Andi Muhammad Irfan Taufan Asfar, and Andi Muhamad Iqbal Akbar Asfar 020065

Numerical verbal of a pre-school child: Case study on Qory
Syarifuddin, Nasution, Andang, Edi Mulyadin, and Atmarita 020066

Existence of the unsteady heat conduction in Sobolev space and numerical technique with twenty-one global nodes
Mohamad Tafrikan, Yolanda Norasia, and Mohammad Ghani 020067

A mathematical modeling for education
Hardi Tambunan 020068

The effect of mathematics anxiety towards students' metacognition ability in 12th graders
Patrisius Afrisno Udil and Israfil 020069

The level of mathematics reflective abstraction of pre-service elementary school teachers
Nuhyal Ulia, S. Budi Waluya, and Walid 020070

Creative thinking ability of prospective mathematics teacher in solving statistical problems based on self concept mathematics
Rini Utami, St. Budi Waluya, and Walid 020071

The analysis of learning disciplines and mathematical concepts mastery on learning outcomes using structural equation modeling
Virgana, Merry Lapasau, Acep Musliman, Sulis Setiawati, and Soeparlan Kasyadi 020072

Student's self concept, self regulated learning, and resilience mathematics during the Covid 19 Pandemic in Indonesia
Sherly Yekti, Agustin Patmaningrum, Erdyna Etika, Addin Aini, and Reza Perdana 020073

Use of mathematical cryptanalysis on 'magic tricks'
Benny Yong and Ethan Chang 020074

Exact solutions of time independent Schrodinger equation in cylindrical coordinates for conical pendulum
Rizma Yudatama, Sutrima, and Ririn Setiyowati 020075

Application of the robust capacitated vehicle routing problem with time Windows model on gallon water distribution
Evi Yuliza, Sisca Octarina, Ning Eliyati, Fitri Maya Puspita, and Yulischa Jesi Angela 020076

Preface: The 6th National Conference on Mathematics and Mathematics Education (SENATIK)

The 6th National Conference on Mathematics and Mathematics Education (SENATIK) was held by Mathematics Education Study Program, Universitas PGRI Semarang, Indonesia, in 11 August 2021. The seminar theme is Numerize and Digitaze of Mathematics Toward Freedom of Learning. According to the theme, this seminar aims to improve mathematics teaching, solve mathematics problems, and expand mathematics contribution to society.

Freedom of learning is a policy implemented by the Indonesian Ministry of Education and Culture. Freedom learning encourages students to master literacy, numeracy, and character. Numeration is one of the ways to make mathematics easy. At the same time, it provides opportunities for students to collaborate, has critical thinking, creative thinking, communication, good character, and face the challenges of an increasingly global world with advances in science and technology. Having numeracy skills will impact good thinking patterns and habits associated with numbers or calculations with existing problems.

Along with the freedom learning program development during the COVID-19 pandemic, it is very clear that technological developments have a high impact on the education world. This impact also occurs in the learning process, especially in accessing information as a learning resource, both online and offline learning. The availability of abundant information and easily accessible also causes learning to experience a digitization process. The era of digitalization brings challenges as well as opportunities in the world of education. There is an opportunity to integrate technology into the learning process so that learning outcomes are more effective. The integration of technology in the learning process results in digitization in the education world, especially in the learning process. The findings that were discussed in the seminar: In mathematics learning and problem-solving, teachers and students need technology. Integration of mathematics and technology is a crucial process.

There are 151 manuscripts through the peer-review and end up with 76 papers which are published in this AIP Conference Proceeding. Together with the keynote speakers and the presenters, they shared their research results on different fields in the plenary and parallel sessions attended by more than 300 participants.

We want to thank the keynote speakers; 1) Prof. Helia Jacinto, Ph. D. (University of Lisbon, Portugal); 2) Dr. Rully Charitas Indra Prahmana, S.Si., M.Pd. (Universitas Ahmad Dahlan, Indonesia), and; 3) Dr. Muhtarom, M.Pd. (Universitas PGRI Semarang, Indonesia). Many thanks go as well to the speakers in the workshop session that are Sutrisno, S.Pd., M.Pd. (Universitas PGRI Semarang, Indonesia) and Dr. Muhtarom, M.Pd (Universitas PGRI Semarang, Indonesia). We also would like to thank all the committee for arranging this conference.

The conference's success is achieved due to the support and commitment of many people, and we acknowledge their contribution, especially all the participants and presenters. For all participants and presenters, we hope they enjoy the seminar, so they are valuable, rewarding and improving their knowledge and experiences.

Thank you,

Dr. Widya Kusumaningsih, M. Pd.
Chairman The 6th National Conference on Mathematics and Mathematics Education
SENATIK
2021

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Student literacy towards math problem solving reviewed from online addiction level games

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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.

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]. Wati, Muhtarom, and 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

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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 reported 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 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?

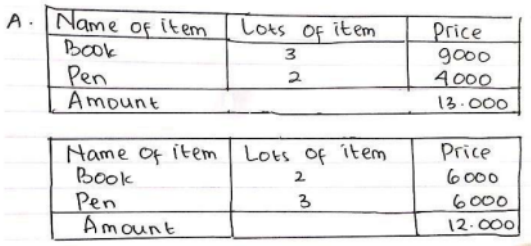
METHOD

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) applying concepts and procedures; and 3) applying, 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. Fig. 1 obviously shows the result of written work on the subject of SRD.


A.

Name of item	Lots of item	Price
Book	3	9000
Pen	2	4000
Amount		13.000

Name of item	Lots of item	Price
Book	2	6000
Pen	3	6000
Amount		12.000

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. Fig. 2 obviously 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. The 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.

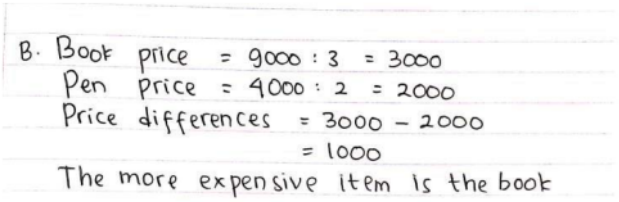


FIGURE 2. SRD subject results in applying concepts and procedures.

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.

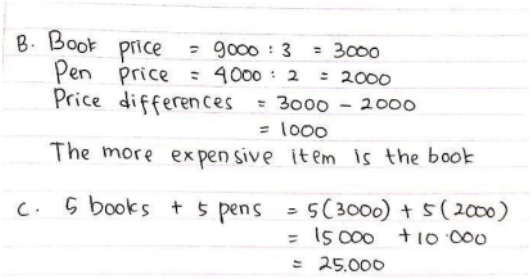


FIGURE 3. SRD subject results in evaluating calculation results.

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 can 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 follows 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 a memorandum showed the purchase of a notebook and a ballpoint by two students at the school cooperative. The memorandum only showed the total price of the purchase of the two items. Subjects can create mathematical models by dissociating 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 $2x + 3y = 12{,}000$.

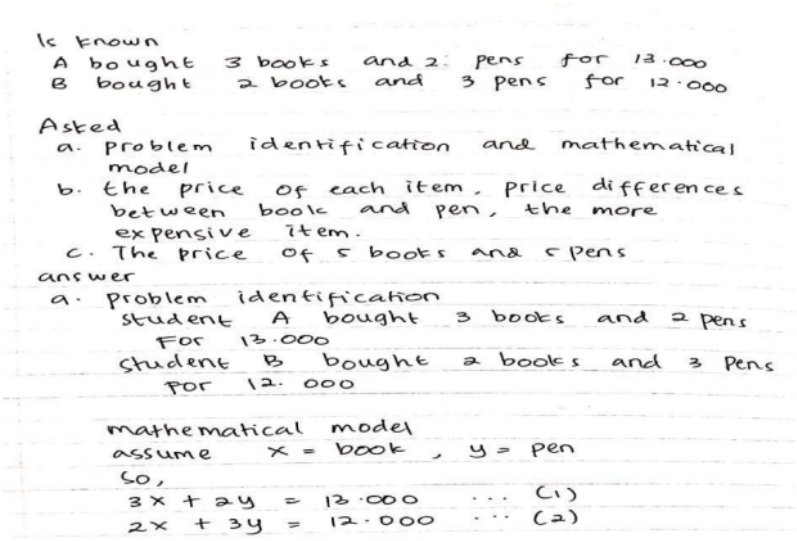


FIGURE 4. ASA subject results in formulating problems.

Both subjects are able to apply facts, concepts, procedures, and reasoning well and systematically find solutions to problems. The subject applies the appropriate mathematical concepts and seeks solutions with routine mathematical processes. Fig. 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.

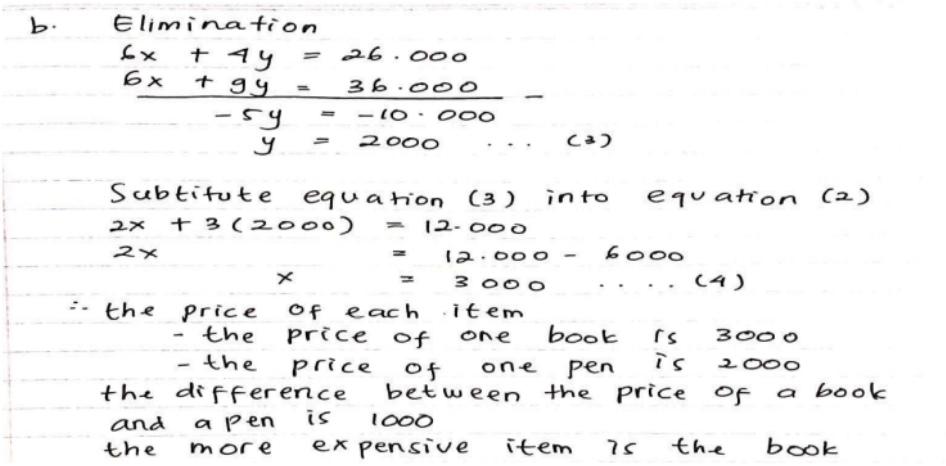


FIGURE 5. ASA subject results in applying concepts and procedures

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. Fig. 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.

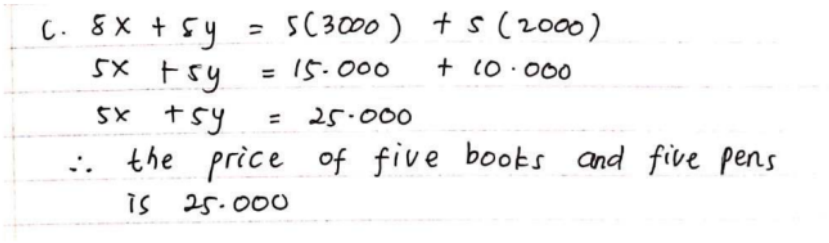


FIGURE 6. ASA subject results in evaluating calculation results.

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] state 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 seen 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. Problem work solutions widely demonstrate the tendency to think through alternative means and be more focused on the correct end result. The point of view is focused on one standard way, showing students' creative side in solving problems. This is also in line with Ulya & Wardono [5], which suggests that playing online games can develop students' more creative way of thinking. Creativity 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 [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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