

Developing Interactive Electronic Student Worksheets through Discovery Learning and Critical Thinking Skills during Pandemic Era

Marfilinda Atma Sari Subekti, Rully Charitas Indra Prahmana*

Universitas Ahmad Dahlan, Yogyakarta, Indonesia

marfilinda1907050015@webmail.uad.ac.id, rully.indra@mpmat.uad.ac.id*

Abstract: The pandemic period forces the teaching and learning process to be carried out online. However, most of the teaching materials are still in the form of those used in pre-pandemics and, therefore, are irrelevant to use. Therefore, educators need alternative teaching materials suitable to support online learning in a pandemic. For this reason, this study aims to produce interactive electronic student worksheets for junior high school students based on discovery learning and oriented towards quality critical thinking skills in terms of validity, practicality, and effectiveness. The development model used is ADDIE, which consists of analysis, design, development, implementation, and evaluation stages. There are a number of research and development instruments used. It consists of electronic student worksheets validation by material and media experts, electronic student worksheets by students, pretest questions, and posttest questions. The results showed that the electronic student worksheets developed were declared feasible in terms of their validity, practicality, and effectiveness. The validity of electronic student worksheets is indicated by the average score of 3 material and media expert validators, each of which falls into the valid and very valid categories. The practicality of electronic student worksheets is evidenced by the average score of student assessments which fall into the very practical category. At the same time, its effectiveness is indicated by an increase in students' critical thinking skills after being given treatment using electronic student worksheets.

INTRODUCTION

Critical thinking skills are high-level thinking skills that are part of 21st-century skills (As'ari, Kurniati, & Subanji, 2019; Spector & Ma, 2019; Zetriuslita, Wahyudin, & Dahlan, 2018; Yılmaz-Özcan & Tabak, 2019; Almulla, 2018). Furthermore, this ability is not an innate ability, so that it can be developed through a structured learning experience (Peter, 2012; Udi & Amit, 2011; Wale & Bishaw, 2020; Demirci & Özyürek, 2017; Dekker, 2020). In addition, this ability is important to have because it is considered valuable across disciplines (Spector & Ma, 2019). Therefore, it takes learning that is oriented to the ability to think critically to be implemented in teaching and learning activities.



In the process of critical mathematical thinking, students will make statements related to the problems faced and connect existing problems with knowledge and experience (Widyatiningtyas, Kusumah, Sumarmo, & Sabandar, 2015). Learners who think critically will always monitor their own thinking to ensure that no conclusion or solution is given prematurely (Chikiwi & Schäfer, 2018). Critical thinking generates critical action (Dekker, 2020) and enables students to synthesize, analyze, and assess their thoughts, beliefs, and actions (Demirci & Özyürek, 2017). Thus, it can be said that critical mathematical thinking is the systematic ability to combine initial knowledge, mathematical reasoning skills, and the ability to apply cognitive strategies in solving mathematical problems.

However, there is no effort made by the teacher to develop students' critical thinking skills (As'ari, Mahmudi, & Nuerlaelah, 2017). Teaching practice to develop critical thinking skills is still relatively limited (Almulla, 2018). Most students are rarely given the opportunity to practice their critical thinking skills in learning (Noer, 2018). As a result, 65.7% of teachers reported that their students' critical thinking skills were underdeveloped (Almulla, 2018). Therefore, it takes a comprehensive effort made by the teacher to facilitate learning that supports critical thinking skills, one of which is by providing teaching materials that are oriented towards this ability.

Mathematics learning that can build and develop students' mathematical critical thinking skills is learning designed to activate students by engaging them with non-routine problems, then encourage them to solve them both individually and in groups (Widyatiningtyas, Kusumah, Sumarmo, & Sabandar, 2015). Learning environments that actively involve students in investigating information and applying knowledge will improve critical thinking skills (Peter, 2012; Noer, 2018). Asking possible assumptions from incomplete information problems can help students develop critical thinking skills (As'ari, Mahmudi, & Nuerlaelah, 2017). Thus, the ability to think critically requires individuals not only to observe conditions as shown but also to question and make conclusions.

Given the current conditions of the Covid-19 pandemic, all learning activities are being carried out online. In online learning, it is recommended to use the asynchronous model, where students do not have to be online at the same time so that students can carry out learning activities at any time (Tanujaya, Prahmana, & Mumu, 2021). This is done to anticipate any disruption to the internet connection of each student. Thus, to support the asynchronous model, teaching materials are needed for students. The teaching materials developed are electronic teaching materials because of the current conditions where learning is online. In addition, the teaching material is interactive design so that students understand the material more easily because, at this time, it requires maximum learning independence. So that two-way communication can occur, namely between teaching materials and students. In order for the teaching material to be more interactive, instructors can add images, videos, and Google forms.



MATHEMATICS TEACHING RESEARCH JOURNAL 139 Vol 13, no 2 SUMMER 2021

One alternative that can be used to support these situations and conditions is the use of interactive electronic student worksheets, discovery learning-based and oriented to critical thinking skills. Discovery learning is the right model for achieving direct student involvement in the learning process, consisting of six stages, namely stimulation, problem identification, data collection, data processing, verification, and drawing conclusions (Aziz, Tarmedi, & Kusmarni, 2018; In'am & Hajar, 2017). Discovery learning is useful for generating objective attitudes, curiosity to solve problems well, and thinking critically (Ramdhani, Usodo, & Subanti, 2017). Discovery learning on electronic student worksheets is an approach that will focus on learning activities. Students are directed to find mathematical concepts. Thus, the position of discovery learning is in its learning activities. Electronic student worksheets do not only contain material and questions. There must also be learning activities such as finding formulas, finding patterns, and many more. In electronic student worksheets, the portion of learning activities must be greater than the portion of the material.

Based on the above reasons, it is necessary to develop interactive teaching materials that can be used to facilitate students in developing critical thinking skills during a pandemic like this. The teaching materials developed in this study are interactive electronic student worksheets combined with discovery learning to develop students' critical thinking skills.

RESEARCH METHODS

This research is development research using the ADDIE model, which aims to develop valid, practical, and effective electronic student worksheets. There are five stages in the development process, namely the analysis, design, development, implementation, and evaluation stages (Branch, 2009). The analysis phase includes analysis of student needs, curriculum analysis, analysis of student characteristics, and analysis of work plans. Furthermore, the design stage includes the preparation of the initial design of electronic student worksheets that are adjusted to the results of the analysis, the instruments needed, and the determination of the validator. Meanwhile, the preparation of electronic student worksheets and validation is included in the development stage. At the implementation stage, researchers carry out several activities that are implemented to students in teaching and learning activities, including implementing the pretest, trial of electronic student worksheets, posttest, and assessment of electronic student worksheets. Finally, the evaluation stage includes assessing the results of the analysis of validity, practicality, and effectiveness, as well as making improvements to electronic student worksheets. For more details, we can see the development procedure carried out in this study in Figure 1.

The population used in this study were grade VII students from one of the state junior high schools in the Selman district. Furthermore, the selected research sample was 27 students of class VII B

Readers are free to copy, display, and distribute this article as long as the work is attributed to the author(s) and Mathematics Teaching-Research Journal Online, it is distributed for non-commercial purposes only, and no alteration or transformation is made in the work. All other uses must be approved by the author(s) or MTRJ. MTRJ is published by the City University of New York. http://www.hostos.cuny.edu/mtrj/



from the school, which would later be used as a large-scale trial class. Meanwhile, for the small-scale trial sample using six students taken from classes VII A, VII C, VII D, VII E, and VII F.

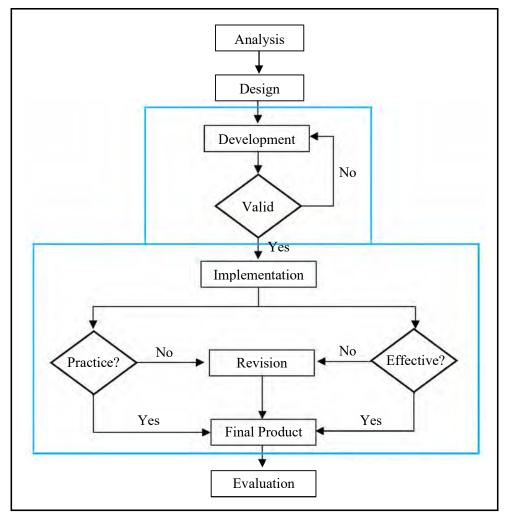


Figure 1: Development Procedure with the ADDIE Model (Branch, 2009)

Data collection techniques consisted of non-test techniques and test techniques. Non-test techniques use interview sheets, observation, and questionnaires. The test technique used the pretest and posttest questions. The data collection instrument was in the form of a questionnaire consisting of validation sheets for electronic student worksheets by material experts, validation sheets for electronic student worksheets by media experts, and assessment sheets for electronic student worksheets by material experts was assessed by material experts and validation sheets for electronic student worksheets by material experts were used to be the student worksheets by media experts were used to be the st



obtain validity data. The student's electronic student worksheets were used to obtain practical data. The pretest and posttest instruments were used to obtain the effectiveness data.

The data analysis technique consisted of both qualitative and quantitative data analysis. In quantitative data analysis, all validity, practicality, and effectiveness analyses were carried out. The validity analysis was carried out by calculating the average validation score, followed by looking at the validity category based on the average validation score. The practicality analysis was carried out by calculating the average student assessment score, followed by looking at the practicality category based on the average student assessment score. The guidelines for determining the classification of criteria for categorizing validity and practicality are on a scale of five (Widoyoko, 2018). Meanwhile, the effectiveness analysis was carried out by processing the pretest and posttest values with SPSS to see the value of paired samples test. If the value of paired samples test > 0.05, then H0 is accepted, so the electronic student worksheet is not effective in terms of students' critical thinking skills and vice versa. H0 is the condition where means of pretest score equal with means of the post-test score ($\mu pre = \mu pos$), so that there is no significant difference between the mean pretest and post-test scores.

Next, consider the pre (mean pretest) and post (mean posttest) scores. If mean pretest > mean posttest, it means there is a significant decrease between the average value of students' critical thinking skills before and after using electronic student worksheets. It shows that electronic student worksheets are not effective in terms of students' critical thinking abilities and vice versa. Finally, pay attention to the N-Gain value to determine the category of change/increase that occurred. The formula is used to obtain the N-Gain value (Hake, 1999).

RESULTS AND DISCUSSION

a) Analysis Stage

The analysis stage is the initial stage before designing electronic student worksheets. At this stage, analysis of student needs, curriculum, student characteristics, and work plans is performed. The analysis purposed is to develop a student worksheet that suits your needs.

Student Needs Analysis

Observations have been made by interviewing, filling in both the teacher's need analysis sheet and the students' observation sheet. This activity is intended to find out existing problems and students need to solve these exercises based on the teacher's and student's point of view. Based on observations, we found that the average score of students' daily tests and mid-term mathematics exams had not yet reached the minimum qualification score. Furthermore, the learning activities oriented towards developing critical thinking skills have been done through question exercises but



not routinely. Lastly, the teacher has never made interactive teaching materials, and teachers want students always to have an interest in learning mathematics.

During the pandemic, it is difficult to measure the student's understanding and participation on the material delivered. According to the teacher's opinion, the existing obstacles can be overcome by the use of computer technology, such as the use of interactive electronic teaching materials. At least teachers can find out who has completed the assignment and be able to monitor students' activities in it.

As many as 86.7% of students are agreed if they can have a mathematics learning medium using a computer. Furthermore, 70% of students enjoy learning mathematics using computers, and 60% prefer learning to use computers compared to textbooks. On the other hand, 100% of students use laptops/computers to make assignments, and 63.3% have sought information related to lessons using computers. In addition, 90% of students think learning mathematics using computer assistance can help them understand the material. Lastly, 73.3% of students considered learning mathematics using computer assistance to overcome difficulties, and 83.3% of them often study independently at home.

Teachers are interested in using supporting media such as computers in learning mathematics, especially since schools have complete facilities. The teacher views computer technology as important and needs to use in mathematics learning. Learning mathematics needs to have various interactive electronic teaching materials in order to keep students engaged. The teacher wishes to have the ability to design computer-assisted learning media. Teachers have often made electronic teaching materials for learning mathematics in pdf and documents. However, until now, they have never developed interactive electronic teaching materials. This is because of the abundance of paper materials, limited time to develop teaching materials, demands for maximum learning outcomes, and teachers' limited ability to develop it. Besides, schools do not yet have experts in the design of instructional media (computers), such as interactive electronic teaching materials.

We can conclude from the previous observations that teachers and students alike require interactive electronic teaching materials for mathematics learning. Teachers and students consider how to overcome difficulties in mathematics by utilizing computer assistance. Additionally, students desire novel and interactive teaching materials that incorporate computers/laptops. However, teachers have never developed interactive electronic teaching materials that utilize laptops/computers due to limited time and abilities. Additionally, given that the teacher has provided opportunities for students to develop their critical thinking skills, but not consistently, teaching materials with a critical thinking orientation are required to provide students with additional opportunities to develop their critical thinking skills. As a result, the development of electronic teaching materials that are interactive and geared toward critical thinking skills is necessary.



Curriculum Analysis

From the interviews with teachers, we found that students often experience difficulties in social arithmetic material, for example the concept of interest rate. The teacher assumes that the problem occurs because students have never experienced activities related to it directly. Therefore, they suggest that real examples are needed to help students understand it. One of which is using learning tools that can take an essential role in making real examples to be presented to students.

The researcher's results examining the syllabus and lesson plans show that the school uses the 2013 curriculum. Core Competencies (CC), Basic Competencies (BC), and learning approaches/methods/models are following the 2013 curriculum. In the 2013 curriculum, student-centered learning requires students to be actively involved in learning activities. One approach that can facilitate students to be actively involved in learning activities is discovery learning. Moreover, discovery learning is one of the approaches recommended in the 2013 curriculum.

We develop student worksheets with social arithmetic material based on discovery learning syntax. It requires strong student activeness participation during learning activities to comply with the 2013 curriculum. Core Competencies (CC), Basic Competencies (BC), and Competency Achievement Indicators (CAI) are per the 2013 curriculum. The needs analysis curriculum is in Table 1.

| The 2013 Curriculum's Competencies | Needs Analysis | Electronic Student Worksheets |
|--|--|--|
| Core Competencies (CC) | Students have a curiosity about science. | The presentation ofelectronicstudentworksheetsisfollowingdiscovery learning syntax. |
| Basic Competencies (BC) | Students can recognize and analyze various social arithmetic situations (sales, purchases, discounts, profits, losses, single interest, percentage, gross, net, tare). | In electronic students, worksheets contain problem statement activities (problem identification) to train students to understand a problem. Problem identification activities are part of the discovery learning syntax. |
| | Students can solve problems related to social arithmetic (sales, purchases, | The electronic student worksheets contain practice questions related to |



MATHEMATICS TEACHING RESEARCH JOURNAL 144 Vol 13, no 2 **SUMMER 2021**

| | discounts, profits, losses, single interest, percentage, gross, net, tare). | advantages, disadvantages, and percentages; single flower; discount; as well as gross, net, and tare. |
|---|--|--|
| Competency Achievement Indicators (CAI) | Students are active in learning | The presentation of material on electronic student worksheets is following discovery learning syntax to find concepts independently. Electronic student worksheets are made interactive; all activities are in Google forms. Also, we provide a complaint box to facilitate students' challenges when learning. |

Table 1: Curriculum Analysis

Analysis of Student Characteristics

Class VII students are in the age range 12-14 years, information obtained from the teacher at the interview time. At this time, the age range of 12-14 years is used to properly operate cellphones, laptops, and computers. Based on the results of observations through observation sheets that are shared with students via Google Forms, it is found that 70% of students enjoy learning mathematics using computers. Also, as many as 60% of students prefer to learn using computers rather than textbooks. Therefore, it can be concluded that grade VII students are very close to technology, especially in laptops and computers.

Work Plan Analysis

Researchers created the work plan are as follows:

- a. setting development goals,
- b. compiling a student worksheet design,
- c. compiling the necessary instruments and validating,
- d. testing the validity of electronic student worksheets,
- e. testing electronic student worksheets on small and large-scale classes,
- f. testing the practicality and effectiveness of electronic student worksheets, and
- g. evaluations.
- b) Design Stage

At the design stage, we design electronic student worksheets based on the analysis results. Electronic student worksheets are designed based on discovery learning syntax. They contain



stimulation activities, problem statements, data collection, data processing, verification, and generalization. Electronic student worksheets are designed with critical thinking orientation to contain activities that train students to interpret, analyze, evaluate, infer, explain, and self-regulation. The design of electronic student worksheets is in Figure 2.

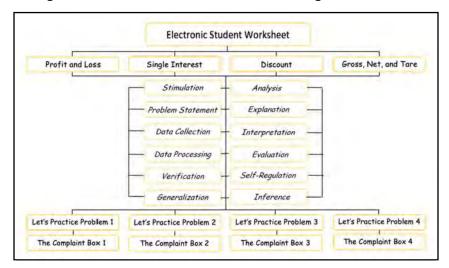


Figure 2: Design of Electronic Student Worksheets

Figure 2 shows that the electronic student worksheets design contains material and evaluation (in practice questions). Electronic student worksheets include activities to understand the concept of gain, loss, percentage, single interest, discounts, gross, net, and tare activities. It also includes exercises as well as a complaint box. The presentation of material in each activity is adjusted to the discovery learning syntax and critical thinking indicators to encourage students to discover concepts independently actively. Such activity is in line with In'am & Hajar (2017) and Ramdhani, Usodo, & Subanti (2017), which state that discovery learning encourages students to take an active role during learning activities. Also, as in Ramdhani, Usodo, & Subanti (2017), researchers did not deliver the material in the final form. We encourage students to identify the problems and also the mathematics concepts by looking for information themselves, compile what is already known and understood in the final form, following the principle of discovery learning.

After students can find the concepts, the evaluation activity continues by doing practice questions. We adjust the instructions for working on and practicing questions to the critical thinking indicator. The process of adjusting instructions in the work and practicing problems is constructed based on the indicators of critical thinking. This process is started by reviewing literature related to this indicator, designing questions that have these skill indicators, implementing them in student worksheets made as part of sample questions, practice questions, and learning evaluations, and finally validating them to the experts. Furthermore, at the end of each exercise, a complaint box is



provided. We also offered a complaint box to facilitate students to express various difficulties so that the teacher can immediately find out. All activities in electronic student worksheets are connected to Google Forms so that the teacher can immediately recognize students' activeness in learning.

In this study, in addition to electronic student worksheets, we prepare several instruments, including test instruments (pretest and posttest questions) and various instruments needed in the development of electronic student worksheets. It includes validation sheets for electronic student worksheets by material experts, validation sheets for electronic student worksheets by media experts, and students' electronic student worksheets.

We used the pretest instrument to determine students' initial abilities before using electronic student worksheets. Meanwhile, we used the post-test instrument to determine students' abilities after using electronic student worksheets. Both material and media experts used the validation sheet of electronic student worksheets to measure the validity of electronic student worksheets, based on each experts' point of view. Students used assessment sheets of electronic student worksheets to see the practicality of electronic student worksheets based on students' points of view. The validator reviewed all instruments used. The names of the validators and their roles are in Table 2.

| Validator | Description |
|--|---|
| Dr. Andriyani, M.Si. (Validator 1) | Validation of material expert instruments (Validation Sheet for Electronic Student Worksheets by Material Experts) Validation of media expert instruments (Validation sheet electronic student worksheets by Media Experts) Validation of student response instruments (Student's Electronic Student Worksheets) |
| Dr. Puguh Wahyu Prasetyo, S.Si., M.Sc. (Validator 2) | Validation of pretest question instruments Validation of posttest question instruments Validation of electronic student worksheets as material experts Validation of electronic student worksheets as media experts |
| Prof. Dr. Ir. Dwi Sulisworo, M.T. (Validator 3) | Validation of electronic student worksheets as media experts |
| Dr. Riawan Yudi Purwoko, S.Si., M.Pd. (Validator 4) | Validation of electronic student worksheets as material experts |



| Dr. Sri Adi Widodo, M.Pd. (Validator 5) | Validation of electronic student worksheets as media experts |
|--|---|
| Sisi Pitriyana, M.Pd. (Validator 6) | Validation of electronic student worksheets as material experts |

Table 2: List of Validators

c) Development Stage

At this stage, electronic student worksheets we developed according to the design that we made. At first, we created the design in Microsoft Word 2013, and then we made a version in pdf format. Then we uploaded it to flip professional and published it in ".exe" format. To produce interactive electronic student worksheets with pictures, videos, audio, and Google Forms help, we design images and videos with the Canva application.

The next step is to prove their validity. Media experts and material experts measure validity using validated instruments. The evaluation of the validity of electronic student worksheets by material experts with 28 statement items is in Table 3.

| Aspects | | Score | |
|-----------------------------|-------------|-------------|-------------|
| Aspects – | Validator 2 | Validator 4 | Validator 6 |
| Content Quality and Purpose | 59 | 56 | 55 |
| Instructional Quality | 63 | 55 | 55 |
| Total | 122 | 111 | 110 |
| Average | | 114,3 | |
| Validity Category | | Valid | |

Table 3: Recapitulation of the Validity Assessment of Electronic Student Worksheets by Material Experts

The validity evaluation by media experts is in Table 4.

| Asposts | | Rating Score | |
|--------------------------------|-------------|--------------|-------------|
| Aspects — | Validator 2 | Validator 3 | Validator 5 |
| Quality of Content | 17 | 18 | 16 |
| Suitability of Learning Design | 13 | 13 | 11 |
| Motivation | 4 | 4 | 4 |
| Design Overview | 40 | 36 | 44 |
| Usage Interactions | 13 | 15 | 13 |
| Accessibility | 13 | 13 | 15 |
| usability | 17 | 17 | 16 |



| Standard Adjustments | 5 | 5 | 4 |
|----------------------|-----|------------|-----|
| Total | 122 | 121 | 123 |
| Average | | 122 | |
| Validity Category | | Very Valid | |

Table 4: Recapitulation of the Validity Assessment of Electronic Student Worksheets by Material Experts

The average score of the three material expert validators shows that electronic student worksheets are in the valid category. The average scores of the three media expert validators indicate that electronic student worksheets are in the very valid category so that the quality of electronic student worksheets is considered valid and worthy of being viewed from the point of view of material experts and media experts.

At this stage, we revised the questionnaire instruments, test instruments, and electronic student worksheets based on validator input. The validator's product validation process produces data on the results of the assessment of electronic student worksheets and input for improvement. The following are some of the input from the media expert validator, which was used as material to improve electronic student worksheets by the researcher.

- 1. The validator suggested creating instructions for using electronic student worksheets entirely and clearly. The researcher added a video tutorial button using electronic student worksheets that connect to YouTube.
- 2. The validator suggests replacing the back sound with a dialogue/conversation voice. Researchers changed the sound of the back sound in videos 1, 2, and 3 with a female conversation voice. We then change the male into a female image.
- 3. The validator recommends that the command sentences' writing on pages 11, 12, 13, 16, 25, 26, 27, 30, 40, 41, 42, 52, 53, and 54 be clarified. Researchers change the word "above" with the specific page in question. We also made improvements to other pages. An example of writing a command sentence revision is in Figure 3.

The validator recommends that the audio on pages 20, 35, 47, and 57 be clarified. We used audio on pages 20, 35, 47, and 57 to convey instructions on students' practice questions. However, because it seemed unclear its usefulness, the researchers removed the audio. The instructions for completing the practice questions are only in Google Forms, which connects to the box provided to answer.

4. The audio sound on the complaint boxes pages 21, 36, 48, and 58 is too low to hear. Also, students can't see the form of motivation on the electronic student. The researcher replaced the clearer audio and added motivational sentences provided in Figure 4.

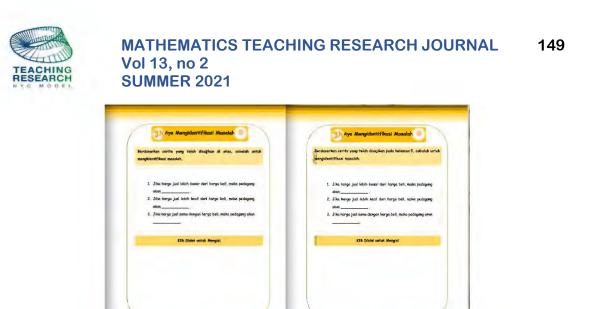


Figure 3: Before (Left) and After Revision of Writing Command Sentences (Right)

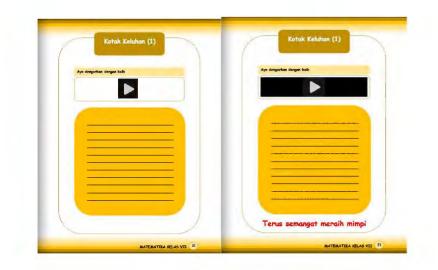


Figure 4: Before (Left) and After Audio Revision and Adding the Motivation Quote (Right)

5. Students will find it difficult to do activities using Google Forms. The validator suggests looking for a more practical step. The researcher added the command in Google Forms to take photos related to the results of activities. They sent the photos to researchers. Because the data obtained will be used again in the next activity. The revision results are in Figure 5.



MATHEMATICS TEACHING RESEARCH JOURNAL 150 Vol 13, no 2 SUMMER 2021

| ama Lengi | ine F | | | | | | | | |
|---|--|--|--|---|---|---|--|--|---|
| мата селдкар | | | | | Jone Maria | 41 | | | |
| awainan Aro | 0 | | | | | | | | |
| | | | | | Petunjuk Par | ngerjaa | in: bei | dasa | rkan |
| | | | | | cerita halam | an 9. c | obala | h lene | skapi |
| | | | | | informesi-in | | | | |
| etunjuk Pe | oppring | n ha | dana | dian. | dengan ben | | - Para | | |
| | | | | | Provident meta | | | | |
| erita halam | nan 9, c | obala | hleng | gkapi | Tablet 1 Marga | | - | | - |
| | | | 100.00 | 1.4 | Added a president | State plan, plan | An I've spir | | Party of Lot of |
| formasi-in | formas | a pad | a labi | elit | | | 1 | | |
| nformasi-in engan ben | | ii pad | a lab | eli | Just States | Harge Ball Brapabil | - Jun Prominio | Tarpate | Sugardia Brighted |
| | | a pad | a lab | elj | Janet Sellings | | 300 (******* (******** (****** | Vargedie Maarweg Hill | |
| engan ben | iar, " | | | | Burdaya (Jan) Burdaya (Jan) Tabiga (| Angerty Star Star | 965 105 | tile tile tile | frank) s71 jaj |
| | iar, " | n Just siz | Teaste | | Bundaya Jako Bundaya Jakot Natiograf Bunday Tama | é-gabi all all fill | 993 993 -165 121 | 1004992 413 403 100 | NR NR Juli DI |
| engan ben Tatel 1-Hern | iar, " | n Juli da Juli | Tegale | | Bundaya Jako Bundaya dipart tagtagate Kasalanya Tagtaya Kasalanya Tagtaya | Angestel sall sall till (Jail | anner) Max 165 Lat Lat | 10049992) 41.3 40,1 100.1 101.1 102.1 | APT APT (P) (D) (D) (D) (D) |
| engan ben | IAF. ^{II} I Beli dos Han | n Just siz | Teaste | Auman- | Bundaya Jako Bundaya Jakot Natigari Bunday Tama | é-gabi all all fill | 993 993 -165 121 | 1004992 413 403 100 | NR NR Juli DI |
| engan ben Tatel 1-Hern | IBC ^B Beli dae Han Hange Bek | ge Just siz Just Primitik | Tergalie mik Torgali | Sump Hurge Just | Bundaya Jako Bundaya dipart tagtagate Kasalanya Tagtaya Kasalanya Tagtaya | dr-gadd sdl sdl fil Del sql | anner) Max 165 Lat Lat | 10049992) 41.3 40,1 100.1 101.1 102.1 | APT APT (P) (D) (D) (D) (D) |
| engan ben Tabel I. Henn Zana Samay | iaf, " Ref. don Hain Filmige Bell (replath) | ar Just sar Just Printen (Surfr) | Tergasler mik Targast (betw) | Sumat Hange Jian | Buntys Jack Bunnys (Auf Tagligh Kaliniy Tani Karinis Farts Kaning Salan | dr-gadd sdl sdl fil Del sql | anner) Max 165 Lat Lat | 10049992) 41.3 40,1 100.1 101.1 102.1 | APT APT (P) (D) (D) (D) (D) |
| engan ben Tabel I. Henn Zana Samay Samay Shan | läf; ^s Het don Hen Henge Bek (replat) (k) | an Just san Just Pression (Juster) [h] | Fergetier mak Target [Infer] Re[| Sumay Parga Just (repub) Jat | Buntys Jack Bunnys (Auf Tagligh Kaliniy Tani Karinis Farts Kaning Salan | dr-gadd sdl sdl fil Del sql | anner) Max 165 Lat Lat | 10049992) 41.3 40,1 100.1 101.1 102.1 | APT APT (P) (D) (D) (D) (D) |
| engan ben Tabel J. Henn Zan Sanny Sanny Dah Sanny Dah | Berli dan Hann Hannya Kan (makata) (ki) (ki) | (Printing (Info) (Info) (In (In) | Troyade Mak Troyad (Mrv) Kal (g) | Sumpy Hange Just Superior Just Dat (U) (p) | Buntys Jack Bunnys (Auf Tagligh Kaliniy Tani Karinis Farts Kaning Salan | dr-gadd sdl sdl fil Del sql | anner) Max 165 Lat Lat | 10049992) 41.3 40,1 100.1 101.1 102.1 | APT APT (P) (D) (D) (D) (D) |
| engan ben Tabel J. Henn Jaco Samoy Samay Han Samay Han Samay Tabe | Bell dan Han Henga Bak (republik) Di Gul (u) | an Judi san Anin Presidenti (Instro) (Ik (Ik (J) | Terasle auk Tergul [Intw] [Intw] [in] | Summer Belgreges Jimme geogenetic Jari Daj Uli | Barray John Barray Anger Salar Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan | Angedel all all Del all all d | (19487) 1933 195 121 161 161 171 | 8004992 413 441 541 541 541 | APT APT URI GI Imi TPT |
| Engan ben Tabel J. Hump Jam Samey Samy Sam Samy Sam Samy Tan Samy Tan Samy Tan Samy Tan | a Berli dan Hain Herri dan Hain (malath) Dal Dal Jah (mala | ne Judi San Judi Pressani (Party) (NJ (N) (N) (N) | Ferante mik Tergel (hete) Isi igi igi igi | Sumpy Hange Just Superior Just Dat (U) (p) | Buntys Jack Bunnys (Auf Tagligh Kaliniy Tani Karinis Farts Kaning Salan | Angedel all all Del all all d | (19487) 1933 195 121 161 161 171 | 8004992 413 441 541 541 541 | APT APT URI GI Imi TPT |
| Engan ben Tabel J. Hump Jam Samey Samy Sam Samy Sam Samy Tan Samy Tan Samy Tan Samy Tan | Berri dan Ham Herriya Des (repetation) Uni (ini) (ini) (ini) (ini) (ini) | ne Judi San Judi Pressani (Party) (NJ (N) (N) (N) | Ferante mik Tergel (hete) Isi igi igi igi | Sumpy Hange Just Superior Just Dat (U) (p) | Barray John Barray Anger Salar Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan Barray Tan | binerit ut ut ut ti ti ti ti ti ti ti ti ti ti ti ti ti | an di t | 010 d | APT (Pri Ci Ini Ini Ini |

Figure 5: Before (Left) and After Revision Adding Commands for Taking Photos of Activity Results (Right)

As a result of the limited knowledge of researchers regarding critical thinking indicators, these indicators are not visible in the pictures and stories presented in electronic student worksheets. So that indicators from Ennis (2011) are challenging to achieve in electronic student worksheets. The validator suggested that this deficiency be replaced by providing instruments to measure critical thinking skills to students during field trials. The input has been implemented according to the ability of the researcher.

We used the input of material expert validators as material for improving electronic student worksheets by researchers, namely the addition of detailed instructions on how to work on questions in Google Forms related to practice problems on pages 20, 35, 47, and 57. Researchers add instructions for working on exercises in Google Forms according to critical indicators thinking, as shown in Figure 6. Also, there is another input from one media expert validator. However, we did not use it to improve electronic student worksheets due to the researcher's limited time. At that time, the validator provided the validation results one day before implementing the trial on a large-scale class.

In addition to revisions to electronic student worksheets, there were revisions to the assessment sheets for electronic student worksheets by students, validation sheets for electronic student worksheets by material experts, validation sheets for electronic student worksheets by media experts, pretest, and posttest instruments based on validator input.



MATHEMATICS TEACHING RESEARCH JOURNAL 151 Vol 13, no 2 SUMMER 2021

| Ayo Latihan Soal | E-LKPD Halaman |
|---|---|
| (2) | 35 |
| * Wajib | Petunjuk Pengerjaan Sool) - Tuliskan informasi yang diketahui dan |
| Kerjakan soal di bawah ini dengan benarl * | ditanyakan dari solal 2. Tentukan langkah-langkah dalam menjawab solal 3. Tuluskan langkah-langkah menjawab |
| Pai Donat mismogan uleg undar modal usata salasar ligi (20.000.000) (20 di bari Malawo dalam 3 falan. Farjame dengar paka siring tukon salam artikan diegan nomeni jung anter. Simblir disitug terpeta kanderutan melani yang hana disepaten hangu paganan hara manapa ligi. 14.80000000, nomi kana terpeta paka siring barandaha . S | soal secara lengkap dengan perhitungan yang benar. 4. Tuliskan kesimpulan dari jawahan yang tefah kalian peroteh. Awah dengan kata * Jadi, |
| Jawaban Anda | 5. Tuliskan kembali juwaban dari soal yang telah disetesaikan lengkap dengan alasannya. 6. Periksalah kembati jawaban yang telah dituliskan |
| Nama Lengkap | Nama dan loto yang terkali dengan Akun Google Anda akan dicatat saat Anda |
| Jawaban Anda | mengupload tile dan mengrum formulir ini Bukan merfilindsatma.95@gmail.com? Ganti akun |
| Kirim | - Wajtz |

Figure 6: Before (Left) and After Revision of Work Guidelines (Right)

d) Implementation Stage

Electronic student worksheets that have been declared fit for use by the validator and have been valid, we can test them on a large-scale class. However, before being tested on a large-scale class, electronic student worksheets are first tested on a small-scale class as part of the research methodology used in this research. Teachers from Class VII A, C, D, E, and F randomly select six students by the teacher. We allow them to take part in learning activities using electronic student worksheets. After gaining a learning experience with electronic student worksheets, we require them to fill out electronic student worksheets by Google forms, including writing impressions related to electronic student worksheets.

After reviewing the assessment results and the impressions of the small-scale trial class students, there has not been any significant problem with the use of electronic student worksheets. Researchers did not improve electronic student worksheets based on students' points of view in small-scale trials. Indeed, there was an unsatisfactory student assessment, and small-scale trial class students did not have time to try all the facilities in electronic student worksheets. It affects students' assessment of electronic student worksheets. After implementing the small-scale trial class, we implement it for the large-scale trial class.



We implement activities in the large-scale trial class with 31 students. Researchers used electronic student worksheets and 31 students in learning activities as the primary focus at the implementation time. All activities carried out by students during the lesson are centered on electronic student worksheets. We provide the details of the implementation of activities in the large-scale trial class below.

First Meeting Activities

The first meeting was on Tuesday, January 19, 2021. At the first meeting held through the WhatsApp group, we gave 31 students of class VII B pretest questions. Giving pretest questions is used to determine students' initial social arithmetic material before learning using electronic student worksheets. The pretest questions consisted of 5 essay questions with an allocation of time to work for 80 minutes. Students work on the pretest questions at their respective homes, considering that at that time and online learning were implemented.

Second Meeting Activities

The second meeting was on Saturday, January 23, 2021, through the WhatsApp group. We introduced electronic student worksheets to students. We gave a Google drive link to download electronic student worksheets. We taught students how to download electronic student worksheets and how to use electronic student worksheets. These activities are to ensure that students are ready for learning the next meeting with electronic student worksheets. To determine students' readiness to carry out learning with electronic student worksheets, the researcher asked students to take a photo of themselves operating electronic student worksheets. Figure 7 shows the student readiness with electronic student worksheets.



Figure 7: Student Readiness with Electronic Student Worksheets



MATHEMATICS TEACHING RESEARCH JOURNAL 153 Vol 13, no 2 SUMMER 2021

Third Meeting Activities

The third meeting will be on Tuesday, January 26, 2021, from 08:00 - 09:00. At this meeting, all class VII B students had started to carry out the learning process with the researcher's electronic student worksheets. Researchers' conveyed directions during the learning process through the WhatsApp group. We stimulated the student through electronic student worksheets, identified problems, carried out data collection activities, and carried out data processing activities. We equipped the stimulation activity with simple questions to facilitate students to develop critical thinking skills. Such activity is in line with (Chikiwi & Schäfer, 2018). They stated that one way to create necessary thinking skills is to ask appropriate questions at the cognitive level in teaching and learning mathematics. Examples of student activity results are in Figure 8.

| Nama Lengkap * | Nama Lengkap * |
|--|---|
| Aurelia Badrapita Danesvari Wibowo | Asyd Mehardeknieng Reheija |
| | Petunjuk Pengerjaan: berdasarkan cerita |
| Conversion of the second second | Instamon 9, coloalety lengkapt Informasi- |
| Petunjuk Pengerjaan: cari informasi di | informasi pada Tabel 1 dengan benar. * |
| buku, internet, atau sumber belajar lainnya | Tabel 1 Hange for an image Salame Asymbolic former |
| untuk menjelaskan Istilah berikut dengan | Norge Ball |
| lepat. * | James Samany Branchi Streeting Streeting |
| | 3mm 50 76 60 60. |
| | Servicesy Ball I Manager Said (1/1 Sale VA) |
| | 5 Fabo |
| 4 Apa yong balan nabaha turmet dengan utilak bianga Radi | Security Plans, (m) (r) (r) (r) Security Illuina (r) (r) (r) (r) |
| feed of | |
| 8. Apo yong dalam bertahas fortant dangan dibisti bianga, Bask | (a) 40 000 (b) 50 bull# (c) 50-0= 50 bull# (d) |
| B403 5 | 50 000 |
| | (e) 35 (100 (f) 50 bann (g) 50 5= 44 bann (h) 44 000 |
| | 44 000 (i) \$0 000 (i) \$0 babs (ii) \$0-6=44 ustr (i) 44 000 |
| Harga Bell (HB) adalah modal yang | (m) 25 000 (n) 50 butir (o) 50-25-25 butir (p) |
| dikeluarkan | 25 000 |
| | (g) 25 000 (r) 50 buttr (s) 50 37+ 73 tustr (t) |
| 2 Harga Jual (HJ) sdalah total pemasukan | 73 II/00 |

Figure 8: Examples of Student Activity Result in Learning 1

Fourth Meeting Activities

The fourth meeting will be on Tuesday, January 26, 2021, from 09:00 - 10:00. At this meeting, VII B students continued the activities at the third meeting, namely data processing. Researchers gave the direction of the learning process through the WhatsApp group. Students continued data processing activities in electronic student worksheets. Examples of student activities in the form of answers are in Figure 9.

Researchers were unable to cover all the worksheets during the learning process. Therefore, we asked students to complete the remaining materials independently. If there are difficulties, students can fill out a complaint sheet that the researcher provided.



MATHEMATICS TEACHING RESEARCH JOURNAL 154 Vol 13, no 2 SUMMER 2021

| Npma Lengkap * | ← Jawaban LK hal 15 - 7 🗐 : |
|--|---|
| Acted Paulina | |
| | |
| Petunjuk Penganjaan bardasarkan fabel 2 | |
| pacte holemen 13. lengkapilah pemyataan di bawak mi | - Unturg - Haran yudi - Haran beli |
| Di Calviari eni i | |
| | - Persantase Kirontongan <u>Unturn (Rp)</u> × 100% |
| here and and and | |
| 2 Analysis and a set of the se | - Rugi + Hanga beli - Hanga jual |
| 1 Annual and the second s | - Persentrose knowed (Rp) x 100 % |
| Auropa Juni disi Auro Narga Inte 4 Auropadan seman para dimenakan mengaharan <u>161 per</u> uma | Hando, bett |
| derega par <u>Di</u> hereja kan 1 'ya galap panag dapat diga dagagalan. <u>an</u> garapa | - limpos - Hamp qual - Hamp beil |
| heraps gave that date: surgar law | |
| 444 patho membrakan semap kewaran semapan | - Persentase impos - Impos (RP) × 100 % Hanga bei |
| | |
| 1 (a) Keuniungan | |
| (b) LetAnbasu | |
| 2 (a). Keuniungan | |
| (b] Lebri braist | |
| s (a) Republication | |
| (b) Lebeh Aveor | |
| 4 (a) impan | |
| (b) Same dengen | |
| Narsa Longkap " | Nama Lengkap * |
| Futtyn Maerikiara Anangeznis | |
| s der 1.4 demonstration aussichtigten | Nabila Zahra Almed In |
| | |
| | |
| Patterna Percentant Concession | |
| Patunyuk Pengenjaan: berdeserkan numusan yang telah kaliun peroleh pada | Petunjuh Pengerjaan: berdasurkan |
| | Petunjuk Pengerjaan: berdaserkan rumusen yang teteh kalian peroteh pada |
| numusin yang telah kalion peroleh pada | |
| numulan yang telah kalipn peroleh pada Nalarnan 15. poba teraptan pada soal di Doweh Ini. | rumusan yang telah kalian peroleh pada |
| numuran yang telah kalan peroleh pada Nalarnan 15, coba seruptan pada soal da bawah Ini. | rumusan yang tetah kalian peroleh pada Ikalaman 15, coba terapkan pada soal di |
| numulaan yang telah kalipin peroleh pada Nedersan 15, coba tenghan pada soal di Doweh Ini. 1. Maga asal asal asal asal asal asal asal a | rumusan yang telah kalian perokeh pada Nalaman 15, coba terapkan pada soal di Ibawah Hii |
| numurian yang telah kalipi peroleh pada Nalarnan 15. coba terupturi pada soal di boweh Ini. 1. Hanga kumi kalipu kalipu di ope projekti | rumusan yang tetah kalian perokeh pada Halaman 15, coba terapkan pada soal di bawah kin 1. Kangda bian terapa tengan kerana keranak atau |
| numurian yang telah kalipi peroleh pada Nalarina 15 coba teraptan pada solal di Doweh Ini. 1 Hagi ang terapatan pada solat solat 1 Hagi ang terapatan pada solat solat solat 1 Hagi ang terapatan pada solat solat solat solat 1 Hagi ang terapatan pada solat sol | rumusan yang tetah kalian perokeh pada halaman 15, coba terapkan pada soal di bawah tin 1. Idagat bara terapa keran mutatiri atau atau pertemi 2. Idagat bara terahari dan penda muta men Manada |
| mamulaan yaang talaba kalion peroleh pada Neekaman 15, coba tempban pada soal di boweb luk tempata ini """"""""""""""""""""""""""""""""""" | rumusan yang telah kalian penoleh pada Halaman 15, coba terapkan pada soal di bawah Hi. I Mayak tera tertapa terapa na marate atab ata partem terapat terapat kenapat kenapat mana ana terapat terapat terapat kenapat mana atab terapat terapat terapat kenapat kenap |
| numusian yang telah kalipin peroleh pada Nakaran 15, coba terapkan pada solal di Doweh Ini. 1 Maya menungkan perungkan di apa apat ang perungkan perungkan di apa apat Nakaran di apa apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa apa apa apa apa a | rumusan yang telah kalian penoleh pada halaman 15, coba terapkan pada soal di bawah khi atagar tera kapat kerupak kerupak kerupa na maraka ialah atagar tera kapat kerupak kerupak nagar kerupak mana kapat kerupak kerupak nagar kerupak nagar kerupak kerupakan kerupak nagar kerupak nagar kerupaka pertaman kerupak nagar kerupak nagar kerupakan kerupakan pertaman kerupaka nagar kerupak nagar kerupakan kerupakan pertaman kerupaka nagar kerupakan nagar kerupakan kerupakan pertaman kerupakan nagar kerupakan nagar kerupakan nagar kerupakan pertaman kerupakan nagar kerupakan nagar kerupakan nagar kerupakan pertaman kerupakan nagar kerupakan |
| numuran yang telah kalion peroleh pada Nalaran 15. coba templaran pada soal di boweh ini. I maga telah pada tengan yang telah I maga telah pada tengan yang telah I maga telah pada tengan yang telah I maga telah pada telah pada telah pada I maga telah pada telah pada telah pada telah pada I maga telah pada te | rumusan yang tetah kalian perokeh pada halaman 15, coba terapkan pada soal di bawah ini. 1 iningki kara terapa keran muja kri pisah ata pada keranga kerang kerang ang ang 1 kerangki kerangan keranga kerang kerang 1 kerangki kerangan keranga kerang kerang |
| numusian yang telah kalipin peroleh pada Nakaran 15, coba terapkan pada solal di Doweh Ini. 1 Maya menungkan perungkan di apa apat ang perungkan perungkan di apa apat Nakaran di apa apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa Nakaran 1 Maga menungkan apa apa apa apa apa apa apa apa apa a | rumusan yang tetah kalian perokeh pada kaleman 15, coba terapkan pada soal di bewaiti ku 1 rangah keru bertapa terapa na nasi di pada di nagah keru pada pada saka ang man 2 rangah keru pada pada saka saka ang 1 rangah keru pada saka pada saka saka sa panjan ang mana |
| numusen yang telah kalipin peroleh pada Nakarnan 15, coba tengbari pada salah buwah ini. I segara sala salar salar salar salar I segara salar salar salar salar salar I segara salar salar salar salar salar I selah salar salar salar salar salar salar I selah salar salar salar salar salar salar Salah nomo i | rumusan yang tetah kalian perokeh pada Halaman 15, coba terapikan pada soal di bawah Hii. 1 (dagat bar terapikan musa di atalah ataupat kar terapa hara da atalah 2 magat kar terapat kar terapat atau sama 3 majat samatan terapat kara da atau 3 majat samatan 3 majat samatan |
| numuran yang telah kalion peroleh pada halarnan 15: coba temphan pada soal di bonweh ini. I naga tempa tempa tempa tempa tempa I naga tempa tempa tempa tempa tempa I naga tempa | rumusan yang tetah kalian perokeh pada halaman 15, coba teraplaan pada soal di bawah ini. 1 iningat kan pada soal ang ang ang ang iningat kan pada ang ang ang ang ang iningat ang panan 1 ang ang ang ang ang iningat ang ang ang ang iningat ang ang ang ang iningat ang ang ang ang iningat ang ang ang ang ang iningat ang ang ang ang ang ang iningat ang ang ang ang ang ang iningat ang ang ang ang ang ang ang ang iningat ang ang ang ang ang ang ang ang ang iningat ang |
| numulaan yang telah kalipin peroleh pada Heakman 15, coba tenghan pada saal di Dawah Ini. I Head an Inite ang tenghan pada saal di Head ang tenghan pada saat sabat sabat sabat sa Head ang tenghan pada sabat sab | rumusan yang tetah kalian perokeh pada Halaman 15, coba terapikan pada soal di bawah Hii. 1 (dagat bar terapikan musa di atalah ataupat kar terapa hara da atalah 2 magat kar terapat kar terapat atau sama 3 majat samatan terapat kara da atau 3 majat samatan 3 majat samatan |
| mamulaan yang telab kalipin peroteh pada Nakaman 15, coba tenapban pada saal di Doweh Ini. 1 staga an an ang | rumusan yang tetah kalian perokeh pada halaman 15, coba teraplan pada soal di bawai hiti. 1 tingga bas belara beran na nas di atali dingga bas belara beran na nas di atali dingga bas belara di atalia di atali tingga bas belara di atali |
| numulaan yang telah kalipin peroleh pada Heakman 15, coba tenghan pada saal di Dawah Ini. I Head an Inite ang tenghan pada saal di Head ang tenghan pada saat sabat sabat sabat sa Head ang tenghan pada sabat sab | rumusan yang tetah kalian perokéh pada halaman 15, coba terapisan pada soal di bawah Hi. 1 tangat keraman kanga terapi keraman kerama tangat keraman kanga terapi keraman Nasada 1 tangat keraman kanga terapi keraman 2 terapi keraman kanga terapi keraman 3 terapi keraman kanga terapi keraman 4 terapi keraman kanga terapi keraman 4 terapi keraman kanga terapi keraman 1 ta Siomang kang panjuli - 4 atopingi keraman kanga terapi keraman 4 terapi keraman kanga terapi keraman 1 ta Siomang kang panjuli - 4 atopingi keraman keraman keraman keraman 4 terapi keraman keraman keraman keraman keraman 4 terapi keraman keraman keraman keraman keraman 4 terapi keraman keraman 4 terapi keraman ker |
| mamulaan yang telab kalipin peroleh pada Heakman 15, coba terephan pada saal de Doweh Ini. I Heak water herberge herberge herberge herberge Herberge water herberge herberge herberge Herberge water herberge herberge herberge Herberge water herberge herberge Herberge water herberge herberge Herberge water herberge herberge Herberge herberge Saab nome i Herberg harberge herberg Herberge herberge Stab nome i Herberg harberge herberg Stab nome i Herberg harberge herberg Stab nome i Herberg harberge herberg Stab nome i Herberg harberge herberg Stab nome i Herberg herberge herberg Stab nome i Herberg herberg herberg Stab nome i Herberg herberg herberg herberg Stab nome i Herberg herberg herberg herberg Herberg herberg herberg Herberg herberg herberg Herberg herberg herberg herberg herberg Herberg herberg herberg herberg Herberg herberg herberg herberg Herberg herberg herberg Herberg herberg herberg herberg Herberg herberg herberg Herberg herberg herberg Herberg herberg herberg Herberg herberg herberg herberg Herberg herberg herberg herberg Herberg herberg herberg Herberg herberg herberg herberg herberg Herberg herberg herberg herberg herberg herberg Herberg herberg herberg herberg herberg herberg herberg herberg herberg Herberg herberg herberg herberg herberg herberg herberg herberg Herberg herbe | rumusan yang tetah kalian peroken pada halaman 15, coba teraplaan pada soal di bawah kii. 1 rangat kera pertama terapa kerana di pendi- ata perata perata perata di pendi- tang terapa kera pertama terapa terapa kerana di terapa kera pertama terapa kerana di pendi- terapa kera perata perata di pendi- terapa kera p |
| numurusin yang telah kalipin peroteh pada Nakarnan 15, coba terapban pada sala di Doweh Ini. 1 Maya mendukukan kalipin di apa di apati angka mendukukan perubakan pada salama 1 Maya di apati perubakan perubakan 1 Maya di apati perubakan perubakan 2 Maya di apati perubakan 2 Maya di apa | rumusan yang tetah kalian perokeh pada halaman 15, coba terapikan pada soai di bawah kin. 1 ranga terapikan pada soai di math ata peroketan peroketan peroketan pada soai ata peroketan peroketan peroketan peroketan ata peroketan peroketan peroketan peroketan Managa terapikan soai peroketan peroketan ata siomay kalin pengari - 4 atobih ja 5 dol(hb)=5 dol umung c diamay raha = 44 dol(hj)=34 dol(hj)=10 dol(hb)=1 1 dol ata ya |

Figure 9: Examples of Student Activity Results in Learning 2

Fifth Meeting Activities

The fifth meeting will be on Tuesday, February 2, 2021, from 08:00 - 09:00. At this meeting, researchers asked students to continue activities at the fourth meeting, namely data processing. Researchers gave directions during the learning process through the WhatsApp group. At this meeting, students continued data processing activities in electronic student worksheets. Furthermore, it is continued with evidentiary activities, conclusion-drawing activities, and activities to fill in the complaint box (for those who wish). Examples of student activities' results



MATHEMATICS TEACHING RESEARCH JOURNAL 155 Vol 13, no 2 SUMMER 2021

in the form of answers that researchers have received through responses on Google form are in Figure 10.

| ← CamScanner 0, 🗐 🙆 🗄 | Page 16 |
|--|---|
| | 1. Profit siomay fish = selling price - purchase price = $50,000 - 40,000 = 10,000$ |
| 12 Antonio Score Stor Darge Sect. Home lat | |
| 1 32 bug | Benefits of siomay skin dumplings = $44,000 - 35,000 = 9,000$ |
| | |
| \$200 | Siomay tofu profit = 44,000 - 30,000 = 14,000 |
| | Sionay one pione +4,000 50,000 14,000 |
| | Profit of cabbage siomay = buy price - selling price = $25,000 - 23,000 = 2,000$ |
| the store in the store out - Harly had | From of cabbage stomay – buy price – sening price – 25,000 – 25,000 – 2,000 |
| - Long - Li Cort | |
| 2000 S | |
| | |
| Jen Changer D | |
| Sent Set . And Set Pick In | Breakeven (Reverse Capital) |
| ي منه منه المالة مع | Siomay pare = sale price - buy price = $25,000 - 25,000 = 0$ |
| * warmer Print ideators, Baid, Printer Adv | meaning no profit and no loss. |
| | |
| 5 topologi control into and the set | 2. Total siomay sales profit = total selling price - total purchase price = 186,000 - 155,000 |
| true, provide structure 17 % | = 31,000 |
| Property law of the state of the | 3. Percentage of fish siomay profit = $\frac{profit}{purchase price} \times 100\% = \frac{10.000}{40.000} \times 100\% = 25\%$ |
| -np3g | purchase price 40.000 |
| Tranta harry Jan 11 La 11 mars | Percentage of benefits of skin dumpling siomay = $\frac{9.000}{36.000} \times 100\% = 25,7\%$ |
| | Percentage of profit tahu siomay $=\frac{14.000}{30.000} \times 100\% = 46,7\%$ Percentage of loss of cabbage siomay $=\frac{lose out}{purchase price} \times 100\% = \frac{2.000}{25.000} \times 100\% = 8\%$ |
| California and the state of the | $\frac{1}{30,000} \log \log \log 1000 = 10000000000000000000000000$ |
| 1000 | Percentage of loss of cabbage siomay = $\frac{10000}{1000000000000000000000000000000$ |
| WID Throw of Interfer | purchase price 23.000 |
| | |
| Gabriella Geneveva Rosemarry | Gabriella Geneveva Rosemarry |
| | |
| | Manual Work: Check the correctness of the answer on page 11 by using the formula |
| | provided. Take one of the answers from page 1 number 16 to substitute in the formula |
| | provided. |
| Petunjuk Pengerjaan: periksalah | 1 |
| kebenaran jawaban halaman 11 dengan | 1. The selling price is greater than the purchase price, then |
| menggunakan rumus yang telah | |
| disediakan. Ambli salah satu jawaban dari | The statement means: |
| nomor 1 halaman 16 untuk disubstitusikan | |
| pada rumus yang telah disediakan. | Selling Price = Buy Price + Profit |
| page rarries yeing televi executions in | |
| | or |
| Forget puri lateits batter dara Harge bats, matter Representation hermitikel benefitie | |
| The spectrum is the month and the line | Buy Price = Sell Price – Profit |
| through these - Wat per Reft + Timesep | |
| Sitist. | Based on the calculation results in the previous activity, try to double-check using one of |
| Tarrya Dau in Barryo Jum - Darung | the above formulas. If the result of the right field is the same as the left field, then your |
| | hypothesis is correct. |
| Bernpering humi perhitungan pada aktivitas sabahanya, catelok sprikas humidi menggumian selah seru numur is ahar Apalais bash | |
| repup lances (some derigen repp later) and in fupplicate latture former | 1. The selling price is greater than the purchase price, then PROFIT. |
| | |
| Harga juai lebih besar dari harga beli, maka | Siomay skin dumplings |
| UNTUNG | |
| | Selling Price = Buy Price + Profit |
| Stomay kulit pangsit | |
| Harga Jual = Harga Beli + Untung | 44,0000 = 35,000 + 9,000 |
| 44.0000 = 35.000 + 9.000 | |
| 44.000 = 44.000 | 44,000 = 44,000 |
| Ruas kanan sama dengan ruas kiri | |
| ladi "Hazan wal labih bagas dan baras bali | The right field is the same as the left field. |
| Jadi, "Harga jual lebih besar dari harga beli. maka UNTUNG' dinyatakan benar | |
| mona officito amporanan ochai | |



MATHEMATICS TEACHING RESEARCH JOURNAL 156 Vol 13, no 2 SUMMER 2021

2 Harga juai lebih kecil dari harga beli, maka RUGI

Siomay kubis Harga jual – Harga beli - rugi 23.000 = 25.000 - 2.000 23.000 = 23.000

Jadi, * Harga jual lebih kecil dari harga beli, maka RUGi * dinyatakan benar

 Harga jual sama dengan harga beli, maka IMPAS

Siomay pare Harga bell = Harga jual - impas 25.000 - 25.000 - 0 25.000 = 25.000

Jadi, * Harga jual sama dengan harga beli,maka IMPAS = dinyatakan benar

10. Jun to an analy

Upload foto

Nama Lengkap *

Atika Resti Athaillah

Petunjuk Pengerjaan: berdasarkan pengalaman yang telah kalian peroleh pada aktivitas sebelumnya, cobalah buat kesimpulan terkait untung, rugi, impas. dan persentasenya.

Dikatakan "Untung", jika harga jual lebih besar dari harga beli. Dikatakan "Rugi", jika harga jual lebih kecil dari harga beli. Dikatakan "Impas", jika harga jual sama dengan harga beli.

Persentase untung dihitung dengan rumus = (Besar Untung ÷ Harga Beli) x 100% Persentase rugi dihitung dengan rumus = (Besar Rugi ÷ Harga Beli) x 100% Persentase impas dihitung dengan rumus = (Besar Impas ÷ Harga Beli) x 100% 2. The selling price is less than the purchase price, hence the LOSS.

Cabbage siomay

Selling price = Buy price - loss

23,000 = 25,000 - 2,000

23,000 = 23,000

So, " The selling price is less than the purchase price, then the LOSS " is declared correct.

3. The selling price is equal to the purchase price, then BREAKEVEN

Bitter melon siomay

Buy price = Selling price - breakeven

25,000 = 25,000 - 0

25,000 = 25,000

So, " The selling price is equal to the purchase price, then BREAKEVEN " is declared correct.

Full Name

Atika Resti Athaillah

Manual Instructions: Based on the experience you have gained in previous activities, try to make conclusions regarding profit, loss, breakeven, and percentage.

It says "Profit", if the selling price is greater than the purchase price.

It says "Loss", if the selling price is less than the purchase price.

It says "Breakeven", if the selling price is equal to the purchase price.

Profit percentage is calculated by formula = (Profit Amount \div Buy Price) x 100%

The percentage loss is calculated by the formula = (Large Loss \div Buy Price) x 100%

Breakeven percentage is calculated with the formula = (Breakeven \div Buy Price) x 100%

Figure 10: Examples of Student Activity Results in Learning 3



MATHEMATICS TEACHING RESEARCH JOURNAL 157 Vol 13, no 2 SUMMER 2021

Sixth Meeting Activity

The sixth meeting will be on Tuesday, February 2, 2021, from 09:00 - 10:00. Researchers direct to do all the practice questions in activities 1, 2, 3, and 4 in electronic student worksheets at this meeting. Researchers provide directions during the learning process through the WhatsApp group. Examples of answers to practice questions from students that researchers have accepted via Google form are in Figure 11.

| 1. Diketahui | Diketahui: |
|---|--|
| - Membeli 2 kalung tepung | Pinjaman uang untuk modal usaha sebesar |
| - Berat tepung 25kg / karung | Rp120.000.000.00 di bank Makmur selama 1 |
| Harga tepung karung 1 = 180.000 | tabun |
| - Harga tepung karung 2 × 186.000 | Pinjaman diangsur setiap bulan selama setahun |
| - Tepung di jual kembali dalam kemasan 1kg | dengan nominal yang sama |
| Ingin mendapat keunlungan 25% | Keseluruhan nominal yang harus dibayarkan |
| Ditanya | Rp146.800.000,00 |
| Harga juel perkg tepung | Rp146.600.000,00 |
| the first here is released | |
| Jawaban | Oitanya: |
| Total berat tepung = 25 kg + 25 kg = 50kg | Besar bunga pada setiap bulan adalah = ? % |
| Total harga tepung = 180.000+ 186.000 = | and the second s |
| 366.000 keyniungan = 25/100 x 366.000 ×91.500 | Penyelesaian: |
| Seluruh hargii jual + 366.000 + 91.500 + 457.500 | Bunga = Keseluruhan nominal yang harus |
| harge 1 kg tepung + 457,500, 50 kg = 9 150 | dibayarkan - Pinjaman uang = Rp148.800.000,00 |
| uniting underlight and mentioned as under | - Rp120.000.000,00 = Rp28.800.000,00 |
| Jadi harga jual tepung per 1 kg adalah 9.150 | Besar bunga pada setiap bulan = 28,800,000 ÷ |
| | 12 bulan = Rp2:400.000,00 |
| Harga jual 1 kg tepung adalah 9.150, karena | Persentase bungs setlap bulan = (Bessr bungs |
| harge tersebut telah mendapat keuntungan 25% | setiap bulan + Pinjaman uang) × 100 % = |
| A Distance of | (2.400.000 + 120.000.000) × 100% = 2% |
| 2 Diketahul - Modal = 250 000 | fermanian a second and a real real |
| - Modal = 250 000 - Harge jual perbungkus = 3 000 | Jadi, besar bunga pada setiap bulan adalah 2% |
| - Bester kerugian | Salat, orser borige pada seriap boran aderan 2 k |
| | Received and a state ball of state and |
| Ditenye | Besar bunga pada setiap bulan adalah 2% |
| Banyak nasi teri pedas yg segual pada hari itu | karena besar angka bunga pada setiap bulan |
| | adalah sebesar Rp2.400.000,00 dan pinjaman |
| Jawabun Kerugian = 25/700 x 250 000 × 37 000 | yang watuk modal usaha adalah sebesar |
| | Rp120.000.000,00 |
| Dikelahui | Hairga brill jengen * = 240.000 |
| municipal volume 50 00 seconds beviationed | - Harga ball jangen 2 = 260.000 |
| Televina 300 000 | - Several transe di aut berchalt datan |
| inger memblel sandal don funga 200 000 yo | kernasen nein 1 Mer dengen harge 15.010 |
| bentulis 40% deleas | Lintung yg didopatkan « It». |
| No. of the second | Unterro |
| Dilaman | Alash ka shi shinarannala parityaya tarifa ina ila ina ila sa s |
| Harge termuteh? | |
| the ge territorete | Jowobian Harga bali menyak goreng 2 arigen - |
| Penyel#saian | 340 040 + 340 D30 = 500 000 |
| diskon=200 000 + 40% =80 000 | Neurologuer + 6/100 r 500/000 = 40/000 |
| =200 000-80 000=120 000 | Havge rial rweyse gorang 2 yengen × 500 010 + 40.000 - 540.000 |
| voucher=200.000-50 | 40.000 - 540.000 Merryak ya setual = 540.000 : 15.000 + xt, |
| *150.000 | here pada pergan a second rest to the first |
| Jadi ya sebaiknya dipilih shinta adalah memilifi | a service house for their costs of the service ser |
| diskday | Jada eeto menyaki gonangi yg tertales paada jerigen |
| alasannya karena diskon 40 iebih murah | New 2 schelish TB Njer |
| dibandingkan youcher 50,000 | |
| unsenangkan yaacner bulaan | Neto militale gotang 18 liter niveria nalo |
| | seluruknya adalah 30 itiw dan dikurangi nata (tada jengeh pertama yang 10 itiw) |
| | times landles be sume have on sites |
| | |
| 11.00 · · · · · · · · · · · · · · · · · · | |
| Upload file | Uplead foto |
| Upload file | |
| Upleed file | 0,000 1010 |
| Uprovid file | |
| | |
| Upked file Namo Lengkap * | Nama Lengkag * |

Figure 11: Examples of Results of Student's Exercise Problem Activities in Learning 4



Seventh Meeting Activities

The seventh meeting will be on Wednesday, February 3, 2021. Class VII B students work on posttest questions from their respective homes. Researchers use post-test questions to determine students' social arithmetic material after learning using electronic student worksheets. The posttest questions consisted of 5 essay questions with an allocation of 80 minutes of processing time. Students work on post-test questions at their respective homes because online learning is being implemented. There were 27 out of 31 students who collected posttest answers.

Eighth Meeting Activities

On Friday, February 5, 2021, the researcher asked students to assess the electronic student worksheets used via the Google form link. The link contained "Student Electronic Student Worksheets by Students." There were 30 out of 31 class VII B students who assessed electronic student worksheets. In addition to providing reviews, students also write down their impressions related to the experience of using electronic student worksheets.

Practicality data were obtained from filling out the questionnaire "Assessment sheets of electronic student worksheets by students" by students. Through the electronic student worksheets assessment sheets, students assess the quality of electronic student worksheets in terms of attractiveness and ease of use. The electronic student worksheets assessment sheet becomes a guide for students to assess the quality of electronic student worksheets in practicality. The assessment sheets for electronic student worksheets are given after students have learned using electronic were given student worksheets. We gave the assessment sheets to 31 class VII B students. There were 30 out of 31 students who assessed electronic student worksheets. However, the student assessment data on electronic student worksheets analyzed were only from 27 students. Three students who had assessed electronic student worksheets did not do the posttest.

The average practicality score was 79.9 in the very practical category. Therefore, we can conclude that from students' assessment of electronic student worksheets related to the practicality of the quality of electronic student worksheets, they meet the very practical category. In addition to providing reviews, students also gave impressions related to the use of electronic student worksheets. A total of 27 students whose assessment results were all analyzed gave a good impression of electronic student worksheets. An example of writing student impressions of electronic student worksheets is in Figure 12.



MATHEMATICS TEACHING RESEARCH JOURNAL 159 Vol 13, no 2 SUMMER 2021

| Kesan ' | Kesan * |
|---|--|
| Adanya E-LKPD memudahkan saya dalam memahami materi,selain itu tampilan E-LKPD yang menarik membuat saya semakin semangat dalam mempelajari matematika | Pembelajaran menggunakan E-LKPD sangat menyenangkan dan membuat kita tidak mudah bosan karena tampilan dan ilustrasi yang menarik |
| 05/07 🖓 🕅 37 0,kiliyrikari | d570% + \$1 ill abbatansa |
| Kesan * | Kesan * |
| | Membual Belajar Dari Rumah / Online lebih |

Figure 12: Examples of Students' Impressions of Electronic Student Worksheets

The students' impressions above show that the use of electronic student worksheets makes students more enthusiastic and less dull in learning mathematics. It indicates that electronic student worksheets can motivate students in learning. Motivation to learn is very helpful in developing critical thinking skills. Such motivation is in line with Spector and Ma (2019), who states that critical thinking requires motivation with a tendency to be curious.

Electronic student worksheets have facilitated students' interpretation, analysis, evaluation, inference, explanation, and self-regulation activities. So, it is in line with (Spector & Ma, 2019). They stated that critical thinking starts with simple experiences such as observing differences, facing confusing statements or problems, questioning someone's views, leading to several cases of investigation, and then more complex experiences such as applying thinking skills. High-level thinking skills are logical reasoning, questioning assumptions, considering and evaluating alternative explanations.

e) Evaluation Stage

The validation and testing activities of electronic student worksheets that researchers conducted have resulted in validity, practicality, and effectiveness values through the data analysis process. We also analyze data to determine the quality of the electronic student worksheets we develop. The process of analyzing data on validity, practicality, and effectiveness is included in the evaluation phase in developing electronic student worksheets. At this stage, electronic student worksheets are evaluated based on the results obtained from the assessment and validator input,



student assessments and impressions, and student pretest and posttest results after being given learning with electronic student worksheets. We used the validator's evaluation to determine the validity of electronic student worksheets from material experts and media experts' points of view. Researchers used student assessments to assess the practicality of electronic student worksheets. Meanwhile, we used the pretest and posttest to determine the effectiveness of electronic student worksheets that can be seen in Appendix 2.

Researchers used to pretest and posttest instruments to obtain data on students' critical thinking abilities related to social arithmetic material. Researchers acquired data from the pretest activities were from students before using electronic student worksheets. In contrast, researchers obtained data from posttest activities from students after using electronic student worksheets. The effectiveness data in this study were obtained by looking at the pretest and posttest results of 27 students in class VII B because four students did not do the posttest. Based on the data analysis results, the value of paired samples test is 0.002 < 0.05. Therefore, there is a significant difference between the average pretest and posttest scores for students' critical thinking abilities.

The average pretest score obtained by students was 77.58. At the same time, the average posttest score obtained by students was 87.33. Based on these results, there is an increase in value from pretest to posttest. For such an N-Gain value, it is 0.43. When viewed from the ability to understand the materials, the growth is in the medium category occurs. Therefore, based on the data obtained, we can conclude that electronic student worksheets are practical when viewed from students' abilities. Such activity is in line with the research results of Ramdhani, Usodo, and Subanti (2017), which show that discovery learning is effective in increasing the average test score for students' critical thinking ability. The increase in the average test score indicates an increase in students' critical thinking skills. In other words, critical thinking skills and academic achievement are closely related to Demirci and Özyürek (2017).

CONCLUSIONS

Electronic student worksheets are said to be successful if they are valid, practical, and effective. The validation of electronic student worksheets and testing of electronic student worksheets on large-scale classes are data on validity, practicality, and effectiveness. The data that have been obtained are analyzed to determine the three points above of the developed electronic student worksheets.

Furthermore, the electronic student worksheets meet the outstanding category from the media expert's point of view with an average validation score of 122 and the good category from the material expert's point of view with an average validation score of 114.3. Product development of

Readers are free to copy, display, and distribute this article as long as the work is attributed to the author(s) and Mathematics Teaching-Research Journal Online, it is distributed for non-commercial purposes only, and no alteration or transformation is made in the work. All other uses must be approved by the author(s) or MTRJ. MTRJ is published by the City University of New York. http://www.hostos.cuny.edu/mtrj/



interactive electronic student worksheets for junior high school students based on discovery learning and oriented towards quality critical thinking skills in terms of practicality. Electronic student worksheets meet the convenient category from a student's perspective, with an average assessment score of 79.9. Product development of interactive electronic student worksheets for junior high school students is discovery-based and oriented towards quality critical thinking skills in terms of effectiveness. There is a significant difference between students' pretest and posttest scores for comprehension ability. Lastly, the average posttest score is more than the average pretest score because there is an increase between the pretest and posttest scores with the medium category. Therefore, electronic student worksheets meet the criteria of being effective.

ACKNOWLEDGMENT

The researcher would like to thank Mr. Suryantoro, S.Pd. as the seventh-grade mathematics teacher who has assisted and accompanied research activities; Mr. Praptonugroho, M.Pd. as the principal who has permitted to research at the school; and to all validators, such as Dr. Andriyani, M.Sc., Dr. Puguh Wahyu Prasetyo, S.Si., M.Sc., Prof. Dr. Ir. Dwi Sulisworo, M.T., Dr. Riawan Yudi Purwoko, S.Si., M.Pd., Dr. Sri Adi Widodo, M.Pd., and Sisi Pitriyana, M.Pd.

REFERENCES

Almulla. (2018). Investigating Teachers' Perceptions of Their Own Practices to Improve Students's Critical Thinking in Secondary Schools in Saudi Arabia. *International Journal of Cognitive Research in Science, Engineering and Education, 6*(3), 15-27.

As'ari, A. R., Kurniati, D., & Subanji. (2019). Teachers Expectation of Students' Thinking Processes in Written Works: A Survey of Teachers' Readiness in Making Thinking Visible. *Journal on Mathematics Education*, 10(3), 409-424.

As'ari, A. R., Mahmudi, A., & Nuerlaelah, E. (2017). Our Prospective Mathematic Teachers are Not Critical Thinkers Yet. *Journal on Mathematics Education*, 8(2), 145-156.

Aziz, R. A., Tarmedi, E., & Kusmarni, Y. (2018). Developing Students 'Information Literature Skill through the Application of learning Discovery Learning Model in Social Studies Learning. *International Journal Pedagogy of Social Studies, 3*(1), 9-20.

Branch, R. M. (2009). Instructional Design: The ADDIE Approach. New York, NY: Springer.



Chikiwi, C., & Schäfer, M. (2018). Promoting Critical Thinking in Multilingual Mathematics Classes through Questioning. *EURASIA Journal of Mathematics, Science and Technology Education*, 14(8), 1-15.

Dekker, T. J. (2020). Teaching Critical Thinking through Engagement with Multiplicity. *Thinking Skills and Creativity*, *37*, 1-9.

Demirci, F., & Özyürek, C. (2017). The Effects of Using Concept Cartoons in Astronomy Subjects on Critical Thinking Skills among Seventh Grade Student. *International Electronic Journal of Elementary Education*, 10(2), 243-254.

Ennis, R. (2011). Critical thinking: Reflection and perspective Part II. *Inquiry: Critical thinking across the Disciplines*, 26(2), 5-19.

Hake, R. R. (1999). *Analyzing Change/Gain Scores*. Woodland Hills: Dept. of Physics, Indiana University.

In'am, A., & Hajar, S. (2017). Learning Geometry through Discovery Learning Using a Scientific Approach. *International Journal of Instruction*, 10(1), 55-70.

Noer, S. H. (2018). Guided Discovery Model: An Alternative to Enhance Students' Critical Thinking Skills and Critical Thinking Dispositions. *Jurnal Riset Pendidikan Matematika*, 5(1), 108-115.

Peter, E. E. (2012). Critical Thinking: Essence for Teaching Mathematics and Mathematics Problem Solving Skills. *African Journal of Mathematics and Computer Science Research*, 5(3), 39-43.

Ramdhani, M. R., Usodo, B., & Subanti, S. (2017). Discovery Learning with Scientific Approach on Geometry. *IOP Conf. Series: Journal of Physics: Conf. Series* 895, 1-6.

Spector, J. M., & Ma, S. (2019). Inquiry and Critical Thinking Skills for The Next Generation: from Artificial Intelligence Back to Human Intelligence. *Smart Learning Environments, 6*(8), 1-11.

Tanujaya, B., Prahmana, R. C. I., & Mumu, J. (2021). The Mathematics Instruction in Rural Area during the Pandemic Era: Problems and Solutions. *Mathematics Teaching Research Journal*, 13(1), 3-15.

Udi, E. A., & Amit, M. (2011). Developing the Skills of Critical and Creative Thinking by Probability Teaching. *Procedia Social and Behavioral Sciences*, *15*, 1087-1091.

Readers are free to copy, display, and distribute this article as long as the work is attributed to the author(s) and Mathematics Teaching-Research Journal Online, it is distributed for non-commercial purposes only, and no alteration or transformation is made in the work. All other uses must be approved by the author(s) or MTRJ. MTRJ is published by the City University of New York. http://www.hostos.cuny.edu/mtrj/



Wale, B. D., & Bishaw, K. S. (2020). Effects of Using Inquiry-Based Learning on EFL Students' Critical Thinking Skills. *Asian-Pacific Journal of Second and Foreign Language Education*, *5*(9), 1-14.

Widoyoko, S. E. P. (2018). Teknik Penyusunan Instrumen Penelitian. Yogyakarta: Pustaka Pelajar.

Widyatiningtyas, R., Kusumah, Y. S., Sumarmo, U., & Sabandar, J. (2015). The Impact of Problem-Based Learning Approach for Senior High School Students' Mathematics Critical Thinking Ability. *Journal on Mathematics Education*, 6(2), 107-116.

Yılmaz-Özcan, N., & Tabak, S. (2019). The Effect of Argumentation-Based Social Studies Teaching on Academic Achievement, Attitude and Critical Thinking Tendencies of Students. *International Electronic Journal of Elementary Education*, *12*(2), 213-222.

Zetriuslita, Wahyudin, & Dahlan, J. A. (2018). Association among Mathematical Critical Thinking Skill, Communication, and Curiosity Attitude as the Impact of Problem-Based Learning and Cognitive Conflict Strategy (PBLCCS) in Number Theory Course. *Infinity: Journal of Mathematics Education*, 7(1), 15-24.



MATHEMATICS TEACHING RESEARCH JOURNAL Vol 13, no 2 SUMMER 2021

Appendix 1. English Transcript for Figure 3, 4, 5, 6, 8, 9, 10, 11, and 12.

| Let's Identify the Problem |
|--|
| ed on the presented story presented, please o identify the problem. |
| f the selling price is greater than the burchase price, then the trader wil f the selling price is less than the buy price hen the trader will f the selling price is equal to the purchase price, then the trader will Click Here to Fill |
| Let's Identify the Problem ed on the story that has been presented or 9, try to identify the problem. |
| f the selling price is greater than the purchase price, then the trader wil f the selling price is less than the buy price hen the trader will f the selling price is equal to the purchase price, then the trader will |
| Click Here to Fill |
| |

Figure 3: Before (Left) and After Revision of Writing Command Sentences (Right)



MATHEMATICS TEACHING RESEARCH JOURNAL 165 Vol 13, no 2 SUMMER 2021

| <form></form> | The Complaints Box (1) Let's listen well |
|--|---|
| | Complaints Box (1) Let's listen well |
| Terus semangat meraih mimpi MATEMATEKA KELAS VII (21) | Keep the spirit of achieving dreams |

Figure 4: Before (Left) and After Audio Revision and Adding the Motivation Quote (Right)



MATHEMATICS TEACHING RESEARCH JOURNAL 166 Vol 13, no 2 SUMMER 2021

| Nama Lengkap * | Full Name | | | | | | |
|--|--|---|----------------------|--|--|---|--------|
| nwaban Anda | Your answer | | | | | | |
| etunjuk Pengerjaan: berdasarkan erita halaman 9, cobalah lengkapi nformasi-informasi pada Tabel 1 lengan benar. * | in Table 1 co | rrectly. | | | 9, try to comp Price of <i>Sion</i> | lete the inform n <i>ay</i> Sale | natio |
| Tabel & Iverya Rein Intege Zad Ser-Nepades Simony Zurin Removy Nerge Rein Produkt Target Unge Just Speakt Guerry Brends | Types of Si | | Buy Price IDR) | Number of production (items) | Quantity so (item) | ld Selling Prio (IDR) | ce |
| Seemary Sales (a) (b) (c) (d) Seemary Balls Presspect (b) (d) (d) | Fish siomay | | (a) | (b) | (c) | (d) | |
| wy Fades (1) (j) (k) (1) | Dumpling skin | siomay | (e) | (f) | (g) | (h) | |
| nomby Parke 7 (0.) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A | Tofu siomay | | (i) | (j) | (k) | (1) | |
| | Bitter melon si | | (m) | (n) | (0) | (p) | |
| awaban Anda | Cabbage sioma | ay | (q) | (r) | (s) | (t) | |
| Webau Anite | Full Name Your answer Manual Work: b | | ne story | y on page 9, | try to compl | ete the inform | nation |
| etunjuk Pengerjaan: berdasarkan erita halaman 9. cobalah lengkapi Iformasi-informasi pada Tabel 1 | Your answer Manual Work: b in Table 1 correc | ctly. | Price a | | try to compl price of <i>Sioma</i> Quantity sold | | nation |
| etunjuk Pengerjaan: berdasarkan erita halaman 9, cobalah lengkapi nformasi-informasi pada Tabel 1 lengan benar. * | Your answer Manual Work: & in Table 1 correc Tab Types of <i>Siomay</i> | ctly. ble 1. Buy 1 Buy Price (IDR) | Price a | nd Selling P umber of oduction (items) | Price of Sioma Quantity sold (item) | y Sale Selling Price (IDR) | natior |
| stunjuk Pengerjaan: berdasarkan Irita halaman 9. cobalah lengkapi formasi-informasi pada Tabel 1 Ingan benar. * | Your answer Manual Work: & in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay | ctly. ble 1. Buy l Buy Price (IDR) (a) | Price a | nd Selling P umber of oduction (items) (b) | Price of Sioma Quantity sold (item) (c) | y Sale Selling Price (IDR) (d) | natior |
| stunjuk Pengerjaan: berdasarkan rita halaman 9, cobalah lengkapi formasi-informasi pada Tabel 1 singan benar. * | Your answer Manual Work: b in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay | ctly. ble 1. Buy 1 Buy Price (IDR) (a) (e) | Price a | nd Selling P umber of oduction (items) (b) (f) | Price of Sioma Quantity sold (item) (c) (g) | y Sale Selling Price (IDR) (d) (h) | nation |
| tunjuk Pengerjaan: berdasarkan rita halaman 9, cobalah lengkapi formasi-informasi pada Tabel 1 ungan bener: * * ********************************* | Your answer Manual Work: b in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay Tofu siomay | ctly. ble 1. Buy 1 Buy Price (IDR) (a) (c) (i) | Price a | nd Selling P imber of oduction (items) (b) (f) (j) | Price of Sioma Quantity sold (item) (c) (g) (k) | y Sale Selling Price (IDR) (d) (h) (l) | nation |
| etunjuk Pengerjaan: berdasarkan arita halaman 9, cobalah lengkapi formasi-informasi pada Tabel 1 engan benar. * Tete 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - Jung Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter et isryi Jut etn Arget - June Teter 1 - resp ter etn Arget - June Teter 1 - resp tern 1 - resp | Your answer Manual Work: b in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay | ctly. ble 1. Buy 1 Buy Price (IDR) (a) (e) | Price a | nd Selling P umber of oduction (items) (b) (f) | Price of Sioma Quantity sold (item) (c) (g) | y Sale Selling Price (IDR) (d) (h) | nation |
| etunjuk Pengerjaan: berdasarkan erita halaman 9. cobalah lengkapi nformasi-informasi pada Tabel 1 lengan benar. * Tara tamay tara benar. * Tara tamay tara benar. * | Your answer Manual Work: h in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay Tofu siomay Bitter melon siomay | ctly. ble 1. Buy l Buy Price (IDR) (a) (c) (i) (m) | Price a | nd Selling P Imber of oduction (items) (b) (f) (j) (n) | Price of Sioma Quantity sold (item) (c) (g) (k) (o) | y Sale Selling Price (IDR) (d) (h) (l) (p) | aatior |
| etunjuk Pengerjaan: berdasarkan erita halaman 9. cobalah lengkapi formasi-informasi pada Tabel 1 engan benar. * Xetu 1. Honga ten barga bat der Argets Tabel Ketu 1. Honga ten barga bat der Argets Tabel Tama tama ten barga bat der Argets Tabel Tama tama ten barga bat der Argets Tabel Tama tama ten barga bat der Argets ten freihold ten barga bat der Argets ten freihold ten barga bat der Argets ten freihold ten barget barget bat der Argets ten freihold ten barget barget barget barget barget barget barget barget freihold ten barget | Your answer Manual Work: h in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay Tofu siomay Bitter melon siomay Cabbage siomay | ctly. ble 1. Buy 1 Buy Price (IDR) (a) (c) (i) | Price a | nd Selling P imber of oduction (items) (b) (f) (j) | Price of Sioma Quantity sold (item) (c) (g) (k) | y Sale Selling Price (IDR) (d) (h) (l) | aatior |
| James Kamps Streps Kall Jourishing Nonges Kall James Kamps (a) (b) (b) (b) Sames (Lish Mangel Kall (a) (b) (c) (d) Sames (Lish Mangel Kall (c) (c) (d) (c) (d) Sames (Lish Mangel Kall (c) (c) (c) (c) (c) (c) Sames (Lish Mangel Kall (c) (c) (c) (c) (c) (c) | Your answer Manual Work: h in Table 1 correc Tab Types of <i>Siomay</i> Fish siomay Dumpling skin siomay Tofu siomay Bitter melon siomay | ctly. ble 1. Buy I Buy Price (IDR) (a) (c) (i) (m) (q) ake a pictu | Price a | nd Selling P imber of oduction (items) (b) (f) (j) (n) (r) | Price of Sioma Quantity sold (item) (c) (g) (k) (o) (s) | y Sale Selling Price (IDR) (d) (h) (l) (p) (t) | |

(Right)



MATHEMATICS TEACHING RESEARCH JOURNAL 167 Vol 13, no 2 SUMMER 2021

| Ayo Latihan Soal | Let's Practice Problems (2) |
|---|--|
| (2) * Wajib | Answer the questions below properly! |
| rjakan soal di bawah ini dengan nar! * | Pak Dimas borrowed money for business capital of IDR 120,000,000 at Makmur bank for 1 year. Loans are paid off on a monthly month for the same amount. After calculating the total amount to be paid until the loan reaches IDR |
| namingan sang untuk medal awaha setuasar Pp 120 000 000,00 mar akama 1 tuhun Panjanian ikangan pada setua bulan selama ajain namindi yang sama. Satatuh dinitrang termputa kaseburuhan ng humu didegurikan ikangga pajaman kana mencapai Pp 0,00, maka basar tunya pada antap bulan adalah % | 148.800.000, then the interest on each month is %. |
| awaban Anda | Your answer |
| lama Lengkap | Full Name |
| Jawaban Anda | |
| | Your answer |
| Grim | Your answer Submit |
| | |
| -LKPD Halaman | Submit ESW Page 35 |
| E-LKPD Halaman 35 etunjuk Pengerjaan Soal: Tuliskan Informasi yang diketahui dan Itanyakan dari soal. | Submit |
| E-LKPD Halaman 35 etunjuk Pengerjaan Soal: Tuliskan informasi yang diketahui dan itanyakan dari soal. Tentukan langkah-langkah dalam nenjawab soal. Tuliskan langkah-langkah menjawab oal secara lengkap dengan perhitungan | Submit ESW Page 35 The instruction of Problem Work: 1. Write down the information that is known |
| E-LKPD Halaman 35 etunjuk Pengerjaan Soal: Tuliskan informasi yang diketahui dan itanyakan dari soal. Tentukan langkah-langkah dalam nenjawab soal. Tuliskan langkah-langkah menjawab oal secara lengkap dengan perhitungan ang benar. Tuliskan kesimpulan dari jawaban yang elah kalian perofeh. Awali dengan kata * | Submit ESW Page 35 The instruction of Problem Work: 1. Write down the information that is known and asked from the question. 2. Specify the procedures in answering the |
| Kirim E-LKPD Halaman 35 Petunjuk Pengerjaan Soal: 1. Tuliskan informasi yang diketahui dan ditanyakan dari soal: 2. Tentukan langkah-langkah dalam menjawab soal: 3. Tuliskan langkah-langkah menjawab soal secara lengkap dengan perhitungan yang benar. 4. Tuliskan kesimpulan dari jawaban yang telah kalian peroleh. Awali dengan kata " Jadi, | Submit ESW Page 35 The instruction of Problem Work: 1. Write down the information that is known and asked from the question. 2. Specify the procedures in answering the question. 3. Write down the procedures to answer the |



MATHEMATICS TEACHING RESEARCH JOURNAL 168 Vol 13, no 2 SUMMER 2021

Nama Lengkap *

Aurelia Badrapita Danesvari Wibowo

Petunjuk Pengerjaan: carl informasi di buku, internet, atau sumber belajar lainnya untuk menjelaskan istilah berikut dengan tepat. *

), daa yang lalian katakur karkait dangan ushlah lilanga Salk (148) P

2. Any youg halves hatered interest danger called biorge flast (H2) \times

1. Harga Beli (HB) adalah modal yang dikeluarkan 2. Harga Jual (HJ) adalah total pemasukan

z narga Julai (nJ) abaian totai pernasokai

Nama Lengkap *

Asya Mahardikaning Raharjo

Petunjuk Pengerjaan: berdasarkan cerita halaman 9, cobalah lengkapi informasi-Informasi pada Tabel 1 dengan benar. *

Tabel 1. Harge Bell dan Harge Just dari Penjuaten Sromov

| | diama Ball | Jun | lah | Harge Jud |
|---------------------|------------------------|------------------------|---------------------|-----------|
| Joniz Siemery | Hargs Ball (rupish) | Produkcii (fastiar) | Tarjani (inclin) | (rupioh) |
| Seamoy Dian | (4) | (0) | (1) | (d) |
| Siemey Kell Pangel1 | (n) | (1) | (9) | (h) |
| Sumoy Taka | 6) | Û | (11) | (1) |
| Siomay Para | (m) | (n) | (a) | (p) |
| Siomey Kubis | (9) | (r) | (1) | (*) |

(a) 40.000 (b) 50 butir (c) 50-0=50 butir (d) 50.000

(e) 35.000 (f) 50 butir (g) 50-6≃ 44 butir (h) 44.000

(i) 30.000 (j) 50 butir (k) 50-6=44 butir (l) 44.000 (m) 25.000 (n) 50 butir (o) 50-25=25 butir (p) 25.000

(q) 25.000 (r) 50 butir (s) 50-27= 23 butir (t) 23.000

Full Name

Aurelia Badrapita Danesvari Wibowo

Manual Work: Search the information in a book, internet, or other learning resource to explain the following terms appropriately.

- 1. What do you know about the term buy price?
- 2. What do you know about the term selling price?

1. Buy Price is the issued capital.

2. Selling Price is the total income.

Full Name

Asya Mahardikaning Raharjo

Manual Work: Based on the story on page 9, try to complete the information in Table 1 correctly.

| Types of Siomay | Buy Price (IDR) | Number of production (items) | Quantity sold (item) | Selling Price (IDR) |
|-------------------------|--------------------|------------------------------------|-------------------------|---------------------------|
| Fish siomay | (a) | (b) | (c) | (d) |
| Dumpling skin siomay | (e) | (f) | (g) | (h) |
| Tahu siomay | (i) | (j) | (k) | (1) |
| Bitter melon siomay | (m) | (n) | (0) | (p) |
| Cabbage siomay | (q) | (r) | (s) | (t) |

(a) 40,000 (b) 50 pieces (c) 50-0=50 pieces (d) 50,000 (e) 35,000 (f) 50 pieces (g) 50-6= 44 pieces (h) 44,000 (i) 30,000 (j) 50 pieces (k) 50-6=44 pieces (l) 44,000 (m) 25,000 (n) 50 pieces (o) 50-25=25 pieces (p) 25,000 (q) 25,000 (r) 50 pieces (s) 50-27= 23 pieces (t) 23,000

Figure 8: Examples of Student Activity Result in Learning 1



MATHEMATICS TEACHING RESEARCH JOURNAL Vol 13, no 2 SUMMER 2021

| Nama Lengkap * | Full Name |
|--|--|
| Astrid Paulina | Astrid Paulina |
| Petunjuk Pengerjaan: berdasarkan Tabel 2 pada halaman 13, lengkapilah pernyataan di bawah ini ! Penjudon sionay ikid dinyatahan mengalami(a) kerene honga jaal(b) dari honga bali. Penjudon sionay ikudi pengiti dinyatakan mengalami(a) kerene honga jaal(b) dari honga bali. Penjudon sionay ikudi pengiti dinyatakan mengalami(a) kerena honga jaal(b) dari honga bali. Penjudon sionay kudi pengiti dinyatakan mengalami(a) kerena honga jaal(b) dari honga bali. Penjudona sionay kudi mengalami(a) kerena honga jaal(b) dari honga bali. Penjudoka keresifum kubas dingatakan mengalami(a) kerena honga jaal(b) dari honga bali. Penjudoka keresifum kubas dingatakan mengalami(a) kerena honga jaal(b) dari honga bali. Penjudoka keresifum kubas dingatakan mengalami(a) kerena honga jaal(b) dari honga bali. Neunutungan (b) . Lebih besar (a). Keunutungan (b) . Lebih besar (a). Keuntungan (b) . Lebih besar (a). Keuntungan (b) . Lebih besar (a). Jimpas (b). Sama dengan | Working instructions: Based on Table 2 on page 13, complete the statement below! 1. The sale of fish siomay is expressed to be(a) due to the selling price of(b) of the purchase price. 2. The sale of dumpling skin siomay is stated to have(a) due to the selling price of(b) of the purchase price. 3. Sales siomay tofu otherwise experienced(a) because of the selling price(b) of the purchase price. 4. Sales siomay pare expressed experiencing(a) because of the selling price(b) of the purchase price. 5. Sales of cabbage siomay are expressed to experience(a) due to the selling price(b) of the purchase price. 6. The overall sales of siomay are expressed to be experiencing(a) due to the selling price of(b) of the purchase price. 1. (a). advantage (b). Larger 2. (a). advantage (b). Larger 3. (a). Break-even (b). Same as |
| Untung = Harga jual - Harga bell Persentase Keuntungan = <u>Untung (Rp)</u> × 100% Harga Bell Rugi = Harga bell = Harga jual Persentase Kerugian = <u>Rugi (Rp)</u> × 100% Harga bell Impos = Harga jual = Harga bell Persentase impas = <u>Impos (Rp)</u> × 100% Harga bell | Profit = Selling Price - Buy Price Percentage of profit = $\frac{Profit(Rp)}{Buy price} \times 100\%$ Loss = Buy Price - Selling Price Percentage of loss = $\frac{Loss(Rp)}{Buy price} \times 100\%$ Break-even = Sale Price - Buy Price Percentage of Break-even = = $\frac{Breakeven(Rp)}{Buy price} \times 100\%$ |

Readers are free to copy, display, and distribute this article as long as the work is attributed to the author(s) and Mathematics Teaching-Research Journal Online, it is distributed for non-commercial purposes only, and no alteration or transformation is made in the work. All other uses must be approved by the author(s) or MTRJ. MTRJ is published by the City University of New York. http://www.hostos.cuny.edu/mtrj/

169



MATHEMATICS TEACHING RESEARCH JOURNAL 170 Vol 13, no 2 SUMMER 2021

Nama Lengkap *

Fariya Munthiani Ananzizah

Petunjuk Pengerjaan: berdasarkan rumusan yang telah kalian peroleh pada halaman 15. coba terapkan pada soal di bawah ini.

- Historphi balan bashlangan, manapati, alau teasa datu purjualim kartug jonu kashay
 Etilapalah lanan kashlangan kari punjualipi anang anang
- naaslandan. 9. Sistempigih baaw jaineettaan Imeetangan, barugan, urtas mijate Jan
- padyadan ketap jatuk kentang. 4. Untupplak lenige perdantang kenyelangan dari yanyadan semen-

Soal nomor 1

- Keuntungen slomay ikan Harga Jual - Harga Beli 50.000 - 40.000 - 10.000

 Keuntungan slomay kulit pangsit Harga Jual - Harga Beti 44.000 - 35 000 = 9,000

- Keuntungan slomay lahu Harga Jual - Harga Beli 44,000 - 30,000 = 14,000

- Kerugian stomay kubis

Nama Lengkap *

Nabila Zahra Almedifa

Petunjuk Pengerjaan: berdasarkan rumusan yang telah kalian peroleh pada halaman 15, coba terapkan pada soal di bawah ini.

- Hitseppi lasar incrisegas increpen atas massimi astropyrepi angeny
- Resolution
- performentation of the pixel station A fiftyngen been persentere mustinger dere parputer samp
- there intolerates

1.a Slomay ikan= 50,000(hJ)-40,000(hb)=10,000 untung

- b.Slomay kulit pangsit =
- 44.000(h))-35.000(hb)=9.000 untung c.Siomay tahu = 44.000(h))-30.000(hb) =
- 14.000 untung
- d Slomay pare = 25.000(hj)-25.000(hb) = 0 Impas
- e Siomay kubis ≈ 25.000(hb)-23.000(hj) ≈ 2000 rugi

Full Name

Fariya Munthiani Ananzizah

Manual Work: Based on the formula you have obtained on page 15, try applying in the question below.

- 1. Calculate the profit, loss, or breakeven of the sale of each type of siomay.
- 2. Calculate the profit from the overall siomay sale.
- 3. Calculate the large percentage of profit, loss, or breakeven from the sale of each type of siomay.
- 4. Calculate the large percentage of profit from the overall siomay sale.

Problem number 1

- Advantages of fish siomay = sale price buy price = 50,000 40,000 = 10,000
- Benefits of skin dumpling siomay = sale price buy price = 44,000 35,000 = 9,000
- Advantages of tahu siomay = sale price buy price = 44,000 30,000 = 14,000
- Disadvantages of cabbage siomay = buy price selling price = 25,000 23,000 = 2,000
- Breakeven bitter melon siomay = 25,000 25,000 = 0

Full Name

Nabila Zahra Almedifa

Manual Work: Based on the formula you have obtained on page 15, try applying in the question below.

- 1. Calculate the profit, loss, or breakeven of the sale of each type of siomay.
- 2. Calculate the profit from the overall siomay sale.
- 3. Calculate the large percentage of profit, loss, or breakeven from the sale of each type of siomay.
- 4. Calculate the large percentage of profit from the overall siomay sale.
- 1.a. Fish siomay = 50,000 40,000 = 10,000 profit
- b. Skin dumpling siomay = 44,000 35,000 = 9,000 profit
- c. Tofu siomay = 44,000 30,000 = 14,000 profit
- d. Bitter melon siomay = 25,000 25,000 = 0 breakeven
- e. Cabbage siomay = 25,000 23,000 = 2,000 loss

Figure 9: Examples of Student Activity Results in Learning 2



Jadi, "Harga jual lebih besar dari harga beli,

maka UNTUNG" dinyatakan benar

MATHEMATICS TEACHING RESEARCH JOURNAL 171 Vol 13, no 2 SUMMER 2021

| ← CamScanner 0 🗏 🎯 🕴 | Page 16 |
|---|--|
| the second se | 4. Profit siomay fish = selling price - purchase price = 50,000 - 40,000 = 10,000 |
| 2 British and I'me. Harry 2011. Harris 2011. 2 Britishargun Silangan I'me. Harry 2011. 50 geon - 40, cm 20 | |
| * 10.000 - 40.00 B | Benefits of siomay skin dumplings = $44,000 - 35,000 = 9,000$ |
| - Brunnan canno toda Bearin Wheeter - 75-000 | |
| 1,000 | Siomay tofu profit = $44,000 - 30,000 = 14,000$ |
| - by and - by and - by and | Profit of aphrage giometry – huy price calling price – 25,000 – 22,000 – 2,000 |
| Warkings - Gioma Instar (Harlas fel) - Harlas Juni | Profit of cabbage siomay = buy price - selling price = $25,000 - 23,000 = 2,000$ |
| · C CPC 2000 | |
| | |
| | |
| | Breakeven (Reverse Capital) |
| | Siomay pare = sale price - buy price = $25,000 - 25,000 = 0$ |
| ל יוילי, איז | meaning no profit and no loss. |
| States | |
| Barry and Barry | 5. Total siomay sales profit = total selling price - total purchase price = 186,000 - 155,000 |
| ta m | = 31,000 |
| Piterive Journey, Loren 1-1 mag, <u>Maria</u> Bana Bana | 6. Percentage of fish siomay profit = $\frac{profit}{purchase price} \times 100\% = \frac{10.000}{40.000} \times 100\% = 25\%$ |
| 674790-5 51400-997 . MPVT | Percentage of benefits of skin dumpling siomay = $\frac{9.000}{36.000} \times 100\% = 25,7\%$ |
| 5 | Percentage of profit tahu siomay $=\frac{14.000}{30.000} \times 100\% = 46,7\%$ |
| Primary version in the second | $\frac{1}{30.00} \times 100\% = 10,7\%$ |
| HERE Same of March 1 | Percentage of loss of cabbage siomay = $\frac{lose out}{purc^{h}ase price} \times 100\% = \frac{2.000}{25000} \times 100\% = 8\%$ |
| | |
| Gabriella Geneveva Rosemarry | Gabriella Geneveva Rosemarry |
| and the second se | Manual Work: Check the correctness of the answer on page 11 by using the formula |
| | provided. Take one of the answers from page 1 number 16 to substitute in the formula |
| | provided. |
| Petunjuk Pengerjaan: periksalah | provident |
| kebenaran jawaban halaman 11 dengan | 2. The selling price is greater than the purchase price, then |
| menggunakan rumus yang telah | |
| disediakan. Ambil salah satu jawaban dari | The statement means: |
| nomor 1 halaman 16 untuk disubstitusikan | Salling Drive - Dry Drive - Droffet |
| pada rumus yang telah disediakan. | Selling Price = Buy Price + Profit |
| | or |
| Hanga jual labih basar dari hanga bali, exalia Parnyahaan tersebut berantu | |
| Hurga Jual = Hurga Bels & Uniuna | Buy Price = Sell Price – Profit |
| 8764 | |
| | Based on the calculation results in the previous activity, try to double-check using one of the above formulas. If the result of the right field is the same as the left field, then |
| Hurga Brit – Harga Jual – Umany | your hypothesis is correct. |
| Berdosarikan hasil perhitungan pada aktivitas sebelumnya cobalah perikas kembali menggundikun salah sotu rumus di otas. Apabula hasil | your hypothesis is context. |
| rues kenen sama dangan rues keri maka hapotesis kehan benar | 1. The selling price is greater than the purchase price, then PROFIT. |
| 1. Harga jual lebih besar dari harga beli, maka | |
| UNTUNG | Siomay skin dumplings |
| Siemau kulit assast | Selling Price = Buy Price + Profit |
| Siomay kulit pangsit Harga Jual = Harga Beli + Untung | Semigrice Buyrice rion |
| 44.0000 ≈ 35.000 + 9.000 | 44,0000 = 35,000 + 9,000 |
| 44.000 = 44.000 | |
| Ruas kanan sama dengan ruas kiri | 44.000 = 44.000 |

The right field is the same as the left field.

So, "The selling price is greater than the purchase price, then PROFIT" is stated correctly.



MATHEMATICS TEACHING RESEARCH JOURNAL 172 Vol 13, no 2 SUMMER 2021

2.Harga jua) lebih kecil dari harga beli, maka RUGI

Siomay kubia Harga jual = Harga beli rugi 23.000 = 25.000 - 2.000 23.000 = 23.000

Jadi, " Harga jual lébih kecil dari harga bek, maka RUGI " dinyatakan benar

3. Harga jual sama dengan harga bell, maka IMPAS

Siomay pare Harga beli = Harga jual - impas 25.000 = 25.000 - 0 25.000 = 25.000

Jadi, " Harga jual sama dengan harga beli,maka IMPAS " dinyatakan benar

Upload foto

Nama Lengkap *

Atika Resti Athaillah

Petunjuk Pengerjaan: berdasarkan pengalaman yang telah kalian peroleh pada aktivitas sebelumnya, cobalah buat kesimpulan terkait untung, rugi, impas, dan persentasenya.

Dikatakan "Untung", jika harga jual lebih besar dari harga beli. Dikatakan "Rugi", jika harga jual lebih kecil dari harga beli.

Dikatakan "Impas", jika harga jual sama dengan harga beli.

Persentase untung dihitung dengan rumus = (Besar Untung ÷ Harga Beli) x 100% Persentase rugi dihitung dengan rumus = (Besar Rugi ÷ Harga Beli) x 100% Persentase impas dihitung dengan rumus = (Besar Impas ÷ Harga Beli) x 100% 2. The selling price is less than the purchase price, hence the LOSS.

Cabbage siomay

Selling price = Buy price - loss

23,000 = 25,000 - 2,000

23,000 = 23,000

So, " The selling price is less than the purchase price, then the LOSS " is declared correct.

3. The selling price is equal to the purchase price, then BREAKEVEN

Bitter melon siomay

Buy price = Selling price - breakeven

25,000 = 25,000 - 0

25,000 = 25,000

So, " The selling price is equal to the purchase price, then BREAKEVEN " is declared correct.

Full Name

Atika Resti Athaillah

Manual Instructions: Based on the experience you have gained in previous activities, try to make conclusions regarding profit, loss, break-even, and percentage.

It says "Profit", if the selling price is greater than the purchase price.

It says "Loss", if the selling price is less than the purchase price.

It says "Breakeven", if the selling price is equal to the purchase price.

Profit percentage is calculated by formula = (Profit Amount \div Buy Price) x 100%

The percentage loss is calculated by the formula = (Large Loss \div Buy Price) x 100%

Breakeven percentage is calculated with the formula = (Breakeven \div Buy Price) x 100%

Figure 10: Examples of Student Activity Results in Learning 3



MATHEMATICS TEACHING RESEARCH JOURNAL 173 Vol 13, no 2 SUMMER 2021

| 1. Diketahui | 1. Information |
|---|--|
| - Membeli 2 karung tepung | - Buy 2 sacks of flour |
| - Berat tepung 25kg / karung | |
| - Harga tepung karung 1 = 180.000 | - Weight of flour 25 kg / sack |
| - Harga tepung karung 2 = 186.000 | - Price of sack flour 1 = 180,000 |
| - Tepung di jual kembali dalam kemasan 1kg | - Price of sack flour $2 = 186,000$ |
| - Ingin mendapat keuntungan 25% | - Flour resale in packs of 1 kg |
| ingin menaapir keanangan 25% | - Want to get 25% profit |
| Ditanya | |
| Harga jual perkg tepung | Question |
| Harga juar perky tepung | Selling price per kg of flour |
| Jawaban | |
| | Answer |
| Total berat tepung = 25 kg + 25 kg = 50kg | Total weight of flour = $25 \text{ kg} + 25 \text{ kg} = 50 \text{ kg}$ |
| Total_harga tepung = 180.000+ 186.000 = | Total price of flour = $180,000 + 186,000 = 366,000$ |
| 366.000 | Profit = 25/100 x 366,000 = 91,500 |
| keuntungan = 25/100 x 366.000 =91.500 | All selling price = $366,000 + 91,500 = 457,500$ |
| Seluruh harga jual = 366.000 + 91.500 = 457.500 | Price of 1 kg of flour = $457,500 \pm 50$ kg = $9,150$ |
| harga 1 kg tepung = 457.500: 50 kg = 9.150 | |
| | So, the selling price of flour per 1 kg is 9,150 The colling price of 1 kg of flour is 0,150, because the price has benefited 25% |
| Jadi harga jual tepung per 1 kg adalah 9.150 | The selling price of 1 kg of flour is 9,150, because the price has benefited 25% |
| | |
| Harga jual 1 kg tepung adalah 9.150 , karena | 2. Information |
| harga tersebut telah mendapat keuntungan 25% | - Capital = 250,000 |
| | - Selling price of wrapper = 3,000 |
| 2. Diketahui | - Huge losses |
| - Modal = 250.000 | |
| - Harga jual perbungkus = 3.000 | Question |
| - Besar kerugian | How many of spicy anchovy sold that day |
| beda Keragian | |
| Ditanya | Answer |
| Banyak nasi teri pedas ya terjual pada hari itu | $L_{OSS} = 35/100 \times 250,000 = 87,000$ |
| banyak nasi ten pedas yg tenjuai pada narritu | = 250,000 - 87,500 = 162,500 |
| Level and | Lots of spicy anchovies sold = $162,500 : 3,000 = 54$ |
| Jawaban | So, the spicy anchovy rice sold is 54 packs |
| Kerugian = 35/100 x 250.000 = 87.000 | so, the spicy anchovy fice sold is 54 packs |
| | |
| Diketahui: | Informations |
| Pinjaman uang untuk modal usaha sebesar | Information: |
| Rp120.000.000,00 di bank Makmur selama 1 | Loan of money for business capital of Rp120,000,000 at Bank Makmur for 1 year |
| tahun | Loans are paid monthly for a year with the same amount |
| Pinjaman diangsur setiap bulan selama setahun | Total amount payable = IDR148,800,000 |
| dengan nominal yang sama | Figure Figure |
| Keseluruhan nominal yang harus dibayarkan = | Operation |
| Rp148.800.000,00 | Question: |
| Ditanya: | The amount of interest on each month is = $?\%$ |
| Besar bunga pada setiap bulan adalah = ? % | |
| been, bungu pada senap palan adalah - : « | Answer: |
| Penyelesaian: | Interest = Total amount payable - Money loan = IDR 148,800,000 - |
| Bunga = Keseluruhan nominal yang harus | |
| dibayarkan - Pinjaman uang = Rp148.800.000,00 | IDR120,000,000 = IDR 28,800,000 |
| - Rp120.000.000,00 = Rp28.800.000,00 | |
| Besar bunga pada setiap bulan = 28.800.000 ÷ | Interest amount per month = $28,800,000 \div 12$ months = IDR 2,400,000 |
| 12 bulan = Rp2.400.000,00 | • |
| Persentase bunga setiap bulan = (Besar bunga | Percentage interest per month = (Interest rate each month \div Money loan) \times 100 % |
| setiap bulan ÷ Pinjaman uang) × 100 % ≃ | |
| (2.400.000 ÷ 120.000.000) × 100% = 2% | $= (2,400,000 \div 120,000,000) \times 100\% = 2\%$ |
| | |
| a mana and a second a | So, the interest rate on each month is 2% |
| Jadi, besar bunga pada setiap bulan adalah 2% | |
| | |
| Besar bunga pada setiap bulan adalah 2% | The interest rate on each month is 2% because the interest rate in each month is |
| Besar bunga pada setiap bulan adalah 2% karena besar angka bunga pada setiap bulan | The interest rate on each month is 2%, because the interest rate in each month is UDP 2.400,000 and the loan for business conital is UDP 120,000,000 |
| Besar bunga pada setiap bulan adalah 2% karena besar angka bunga pada setiap bulan adalah sebesar Rp2.400.000,00 dan pinjaman | The interest rate on each month is 2%, because the interest rate in each month is IDR 2,400,000 and the loan for business capital is IDR 120,000,000 |
| Besar bunga pada setiap bulan adalah 2% karena besar angka bunga pada setiap bulan | |



MATHEMATICS TEACHING RESEARCH JOURNAL 174 Vol 13, no 2 SUMMER 2021

| Diketabul | Information |
|---|--|
| mendapat voucer 50.00 setelah berbelanja | Information: |
| sepatu 300.000 | We got 50.00 vouchers after shopping for 300,000 shoes |
| ingin memblei sandal dan harge 200.000 ya bertulia 40% diskon | We want to buy sandals at a price of 200,000 written 40% discount |
| | |
| Diranya: | Question: |
| Horga termurah? | Which one the cheapest price? |
| | which one the cheapest price. |
| Penyelesalan: | |
| diskon=200.000 x 40%=80.000 | Answer: |
| =200.000-80.000=120.006 voucher=200.000-50 | Discount = $200,000 \ge 40\% = 80,000$ |
| =150.000 | = 200,000 - 80,000 = 120,000 |
| Jadi ya sebalknya dipilih shinta adalah memilih | |
| diston | Voucher = 200,000 - 50 = 150,000 |
| sissannya Karena diskon 40% lebih murah | |
| dibandingkan voucher 50.000 | C. Chiefe should be shown a discount |
| | So, Shinta should be chosen a discount. |
| | The reason is because the discount is 40% cheaper than the voucher 50,000. |
| | |
| Upload file | Upload File |
| | |
| | |
| | Full Name |
| Nama Lengkap * | Emanuel Laksta Parisadana |
| | |
| EMANUEL LAKSTA PARISADANA | |
| | |
| Harga beli jerigen 1 = 240.000 | 1. Information |
| Harga beli jerigen 2 = 260.000 Seluruh minyak di ual kembali dalam | - Buy 2 jerry cans of cooking oil |
| kemasan neto 1 liter dengan harga 15.000 | - Net jerry can $1 = 18$ liters |
| - Untung yg didepatkan = 8% | - Purchase price of jerry cans $1 = 240,000$ |
| and 3 and party and | |
| Ditanya | - Purchase price of jerry cans $2 = 260,000$ |
| Neto yg seharusnya tertulia pada jerigen ke 2 | - All oil in selling back in net packaging 1 liter with a price of 15,000 |
| | - Profit = 8% |
| Jawaban Harga beli minyak goreng 2 jerigen = | |
| 240,000 + 260,000 = 500,000 | Question |
| Keuntungan = 8/100 x 500.000 = 40.000 | Net that should be written on the 2nd jerry can |
| Herga jual minyak goreng 2 jerigen = 500.000 + | Net that should be written on the 2nd jerry can |
| 40.000 = 540.000 | |
| Minyak yg terjual = 540.000 : 15.000 = 36 | Answer |
| Neto pada jerigen ke 2 = 36-18=18 liter | Buy price cooking oil 2 jerry cans = $240,000 + 260,000 = 500,000$ |
| to the second | $Profit = 8/100 \ge 500,000 = 40,000$ |
| Jadi neto minyak goreng yg tertulis pada jerigen | Selling price of cooking oil 2 jerry cans = $500,000 + 40,000 = 540,000$ |
| ke 2 adalah 18 liter | Oil sold = 540,000 : 15,000 = 36 |
| Neto minyak goteng 18 liter karena neto | Net on jerry cans $2 = 36 \cdot 18 = 18$ liters |
| seluruhnya adalah 36 liter dan dikurangi neto | $1100 \text{ on } \text{Jerry cans } 2 = 30 \cdot 10 - 10 \text{ mers}$ |
| pada jerigen perlama yaitu 18 liter | |
| the state of the state of the state | So, net cooking oil written on the 2nd jerry can is 18 liters |
| | |
| | Net cooking oil 18 liters because the net is entirely 36 liters and reduced net on the |
| Uplead foto | first jerry can is 18 liters |
| opioso roto | |
| | Upload Photo |
| | |
| | Full Name |
| Nama Lengkap * | Alya Shafwa Nirmalayani |
| | |
| Alya Shalwa Nirmalayani | |

Figure 11: Examples of Results of Student's Exercise Problem Activities in Learning 4



MATHEMATICS TEACHING RESEARCH JOURNAL 175 Vol 13, no 2 SUMMER 2021

| Kesan * | Kesan * |
|---|--|
| Adanya E-LKPD memudahkan saya dalam memahami materi,selain Itu tampilan E-LKPD yang menarik membuat saya semakin semangat dalam mempelajari matematika | Pembelajaran menggunakan E-LKPD sangat menyenangkan dan membuat kita tidak mudah bosan karena tampilan dan ilustrasi yang menarik |
| 05702/21 11 57 4ikknrikan | 05/02/21 11.30 dikinimka |
| Impression/Comment | Impression/Comment |
| The existence of ESW makes it easier for me | Learning by using ESW is very fun and makes |
| to understand the materials, in addition to | us not easily bored because of the attractive |
| the attractive display of ESW makes me more enthusiastic in learning mathematics. | look and illustrations. |
| | |
| Kesan * | Kesan * |
| Kesan * Belajar menggunakan E-LKPD merupakan pengalaman yang sangat menyenangkan | Kesan * Membuat Belajar Dari Rumah / Online lebih Menyenangkan,Dan mudah utk di pahami serta digunakan |
| Belajar menggunakan E-LKPD merupakan | Membuat Belajar Dari Rumah / Online lebih Menyenangkan,Dan mudah utk di pahami serta |
| Belajar menggunakan E-LKPD merupakan pengalaman yang sangat menyenangkan 06/02/21 13.05 dikmmkan | Membuat Belajar Dari Rumah / Online lebih Menyenangkan,Dan mudah utk di pahami serta digunakan |
| Belajar menggunakan E-LKPD merupakan pengalaman yang sangat menyenangkan | Membuat Belajar Dari Rumah / Online lebih Menyenangkan,Dan mudah utk di pahami serta digunakan 06/02/21 12.86 dikirimka |

Figure 12: Examples of Students' Impressions of Electronic Student Worksheets



Appendix 2. Pre-test and the post-test translated in English for assess the students' mathematics critical thinking ability

Students' Mathematics Critical Thinking Test

- 1. A trader buys two sacks of rice from a different wholesaler. The weight of rice in each sack is 25 kg. The price of rice in the first and second sacks sequentially is IDR 245,000 and IDR 255,000. The traders plan to resell the rice in new 1 kg packages. If the trader wants a profit of 20%, the selling price for each kg of rice is
- 2. The chicken soup trader spends IDR 600,000 in capital to buy ingredients. Chicken soup is sold at IDR 8,000 per portion. At that time, the chicken soup shop was not as popular as usual, so the traders suffered a loss of 8%. Many of the portions of chicken soup sold at that time were
- 3. In the context of the 25th anniversary, Jaya stores provide shopping vouchers of IDR 50,000 for visitors who have shopped more than IDR 350,000. Shopping vouchers are valid for one day for purchases of goods worth at least IDR 150,000. At that time, Rena bought a bag for IDR 400,000, so she got a shopping voucher. Rena returned to shopping to take advantage of the opportunity. She chose a t-shirt for IDR 200,000, which reads a 30% discount. Rena cannot use coupons and discounts simultaneously, so she has to choose one. To make it cheaper, Rena should choose
- 4. Mrs. Nita borrows business capital from the Makmur bank to develop her culinary business for IDR 36,000,000. Regular installments are paid every month for one year with the same nominal value. After calculating, it turned out that the amount of money deposited until the loan was paid off reached IDR 44,640,000. The amount of interest for each month is ... %.
- 5. Mr. Makmur buys two sacks of flour with the same brand at wholesaler Jaya. The flour weight in the two sacks is different. He purchased the first sack for IDR 175,000 with the words net 25 kg and tare 95 g, and the second sack for IDR 35,000 only says tara 20 g while the net writing has been erased. The flour has been resold at IDR 8,400 in a new package which reads net 1 kg and tara 5 g. The sale of all flours generates a profit of 20%. The net weight that should be written on the second sack is