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Student's Numerical Skills in Solving Mathematical Problems on Numbers Subject in *Maksuba* Cake Context

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Abstract

Numeration is not only useful in solving math problems, but also in everyday life. One of problems that can be found related to numeration is Palembang's special cake called *Maksuba*. The purpose of the research is to describe student's numeracy competence for numbers subject in *Maksuba* cake context. The research type is descriptive research having research subject of 3 grade V elementary school students in the odd semester. The data collected in this research are obtained through written test and interview. Descriptive analysis technique is implemented to analyze the data obtained. In the written test, 2 questions are given in *Maksuba* cake context. The indicators that often appear are applying several types of symbols and numbers related to basic mathematical subject to solve a problem in several types of contexts, problems that occur in everyday life and conducting analysis of the information shown in several forms (diagrams, charts, tables, and graphs). While, the indicators commonly unseen are interpreting on the resulted analysis in order to make a prediction and determining of a decision making. By implementing *Maksuba* cake context, the result shows that two out of three students answer the question correctly even though the questions are uncommon.

Keywords: Mathematics Learning; Number; Numerical Skills

Abstrak

Numerasi tidak hanya berguna dalam memecahkan masalah yang ada pada matematika saja, tetapi juga pada kehidupan sehari-hari yang ada pada sekitar siswa. Salah satu masalah yang bisa ditemukan berkaitan dengan numerasi yaitu kue maksuba khas Kota Palembang yang telah lama dikenal dikalangan masyarakat Kota Palembang. Tujuan dari penelitian yang dilakukan yaitu mendeskripsikan kompetensi numerasi siswa dalam materi bilangan konteks Kue Maksuba. Dalam penelitian yang dilakukan menggunakan jenis penelitian deskriptif. Subjek penelitiannya dengan berupa 3 orang siswa kelas V SD. Teknik pengumpulan data penelitian ini dilakukan dengan melakukan tes dan wawancara. Kemudian untuk menganalisa data yang diperoleh dari hasil pengumpulan data dilakukannya teknik analisa deskriptif. Pada tes, diberikan 2 permasalahan dengan menggunakan konteks

Kue Maksuba. Indikator yang sering muncul adalah menerapkan beberapa jenis simbol dan angka yang berhubungan pada materi matematika dasar guna penyelesaian sebuah permasalahan dalam beberapa jenis konteks masalah yang terjadi dalam kehidupan dan melakukan analisa mengenai informasi yang ditunjukkan dalam beberapa bentuk (diagram, bagan, tabel, grafik, dll). Sedangkan indikator yang jarang terlihat yaitu melakukan penafsiran terhadap analisis yang dihasilkan guna melakukan sebuah prediksi dan penentuan pengambilan sebuah keputusan. Dengan menggunakan konteks kue maksuba hasilnya dua dari tiga siswa dapat menjawab soal tersebut meskipun soal tersebut merupakan soal non rutin.

Kata Kunci: Bilangan; Kemampuan Numerasi; Pembelajaran Matematika

Introduction

In *2013* curriculum *implementation* students are expected to achieve an ability needed in the skills process in the 21st century. Numeration is one of focuses in a minimum competency assessment (AKM) having objective to be a guideline for the government, schools and specifically for teachers to improve the process and quality of learning conducted leading to students learning improvement (Ministry of Education and Culture 2020). The numerical skills are basic skills that cannot be separated from everyday life (Ayuningtyas & Sukriyah, 2020; Kus, 2018). Numerical skills have very important role in the current era (Meliyanti, Raraswati, Hidayat, & Aryanto, 2021; Yunarti & Amanda, 2022). This is because numerical skills are not only useful in solving math problems, but also useful in everyday life, for example making humans more financially savvy and increasing job opportunities (Fatin Fauziyyah, Sunendar, & Damaianti, 2020; Gal, Grotlüschen, Tout, & Kaiser, 2020)

In its development, the definition of numeration has undergone many changes in order to improve the definition itself from time to time (Westwood, 2008). Numeracy as a form of skill possessed for the application of arithmetic concept and numbers operations in everyday life problems (Han, et al., 2017; Maulidina & Hartatik, 2019). Numeracy is also considered as the skill to process, interpret and communicate numerical information in various contexts which involves the use of mathematical concepts to be able to achieve several goals in certain contexts in everyday life and use numbers in these contexts to assist decision making. (Lokan et al., 2000; Goos, Dole, & Geiger, 2012; Westwood, 2021). Numerical skills as techniques and roles of mathematics used to solve problems in everyday life context are the basis for giving consideration to determine decision making conducted by everyone and society (OECD, 2018; Syafriah & Sofian Hadi, 2023)

What becomes a benchmark for conducting curriculum review is the presence of numerical skills in the form of use, interpretation and comparison of several existing models provided in fractions subject. (NCTM, 2007). The mathematical questions can be solved through transformation in process or problems occurring in everyday life, for example, a concept in fractions (Baharuddin, Sukmawati, & Christy, 2021; Jannah & Prahmana, 2019). The use of fractions is applied as a prerequisite by compiling a knowledge of mathematics with a continuous level and in other sciences (Syavira et al., 2021; Wayan Purwa Guna Adnyana & Bennu, 2019). Numerical skills in fractions subject are the priority in student's skills. This is due to various applications in everyday life problems and the topic aimed priorities the learning mathematical skills to be able to make developments at higher level and the application of other knowledges.

In various research about the operations of calculating fractions conducted, many students have difficulties in answering questions. The inaccuracy of ways implemented by the students to answer the questions related to the operations of calculating fractions. The main mistakes include understanding questions, transforming questions, processing and writing skills by concluding questions (Murtiyasa & Wulandari, 2020; Ratna Sari & Rejeki, 2021; Sughesti, Muhsetyo, Susanto, & Matematika, 2020). The factor of making mistake occurring on the students in answering questions about operations of calculating fractions is the inability to understand the operations of calculating fractions concept (Badaruddin et al., 2016; Heru et al., 2022; Marsela, 2018.; Santi & Sudihartinih, 2019.). The mistakes made by the students in answering questions about the operations of calculating fractions show that student's numerical skills are still low. It is as an indicator that teaching and learning process conducted by teachers and students is not ideal (Adawiyah, Makki, & Nisa, 2023).

So, dealing with this problem, it is important to use a context for learning mathematics process. For answering mathematics questions, implementing a context is as the action form conducted to help students using mathematical skills in everyday life problems (Amalia, Rusdi, & Kamid, 2021). In this research, problems with the context of *Maksuba* cake will be implemented to see student's numerical skills for numbers subject.

Maksuba cake is one of Palembang's specialties. It is a cake having sweet and savory taste. It has a characteristic yellowish color and black stripes in the middle that looks like *kue lapis*. The cake is usually served at certain times, for example during *Eid al-Fitr*, *Eid al-Adha* or weddings. *Maksuba* cake are usually provided as one of the gifts at weddings and are handed over by the bride and groom to their parents and in-laws. Apart from that, the *Maksuba* cake can also be used as a delivery

for the groom to the bride during the marriage proposal. During Eid al-Fitr, the *Maksuba* cake is brought back by the newlyweds while visiting their parents and in-laws' homes. This means that the cake is a symbol of appreciation for respected people. *Maksuba* cake is made by a *Panggong*, a term for traditional cooks in Palembang who inherit how to cook certain food from generation to generation. A must-have skill for this cook is keeping a close eye on the fire so the cake does not burn and the coals stay alight. Making this cake takes 3 hours. The researcher has not found prior research related to the context of *Maksuba* cake, so the researcher is interested to conduct the research. The research objective is to describe ~~a~~ student's numerical skills for numbers subject in *Maksuba* cake context.

Method

The research method used in this research is descriptive analysis qualitative research having objective to describe student's mathematical numerical skills for numbers subject in *Maksuba* cake context~~.~~ The research is conducted on 3 research subjects of class V students in Palembang namely ZM, PA and TB, which are selected based on subject teachers' recommendations and the student's willingness. There are two stages in conducting research namely data collection stages consisting of written tests and interviews. The test is used to describe the numerical skills possessed by the students to solve given questions. The validity of the questions is focused on the content, construct~~s~~ and discussion which would then be discussed and corrected by the validator, Dr. Ely Susanti, M.Pd, a lecturer in mathematics education study program at Sriwijaya University.

The research implementation phase includes the data collection stage for the 3 research subjects where the researcher gives test questions and conducts interviews to support the answers from the tests that have been conducted. In data analysis stage, researcher processes and analyzes the data collected from the test~~s~~ and interview~~s~~. Test questions are analyzed based on numerical skills indicators. Then the data from interview are used to compare the results from students' test~~s~~. For the last step, the data are described and concluded related to students' numerical skills. The numerical skills indicators are listed in Table 1.

Table 1. Numerical Skills Indicators

Number	Indicators
1	Applying several types of symbols and numbers related to basic mathematical calculations in solving problems for all kinds of problem contexts occurring in everyday life
2	Analyzing the information shown in several models (diagrams, charts, tables, graphs, etc.)
3	Interpreting the analysis results intended to make a prediction in determining a decision

(Han, et al., 2017)

Result

The test questions given consist of 2 uncommon questions. Both of them are designed using *Maksuba* cake context on numbers subject. The written test is conducted face-to-face with working time of 30 minutes. After all questions are completed, the researcher using three indicators analyzes student's numerical skills written in the answer sheets.

First Question

The first question given is uncommon question for numbers subject. Students are instructed to solve the question based on the way they want.

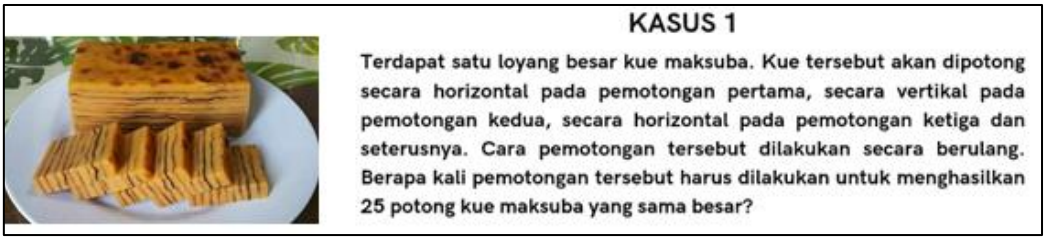

Figure 1. First Question

Figure 1 is the first question given to the 3 students. It is about numbers subject and the students are asked to solve it using their own ways. The following is one of the students' answers.

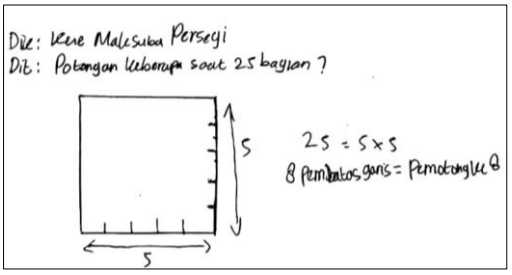

Figure 2. TB's Answers

Based on the result of TB's work in Figure 2, it can be seen that indicator 1 is fulfilled where the student's answer applies many types of symbols and numbers regarding to the interrelationships of basic mathematics in order to solve the question. Same as indicator 1, indicator 2 is also fulfilled. It can be concluded that the student is able to analyze information by representing it in various forms. The student makes the right model from the example by drawing a square. Then, the student uses the square formula to determine the number of unit boundary lines. Indicator 3 is seen after getting the answer. This shows that the student is able to interpret the analysis result in order to make a prediction and decision. Finally, the student is able to decide to produce 25 pieces of cakes needs 8 cuts.

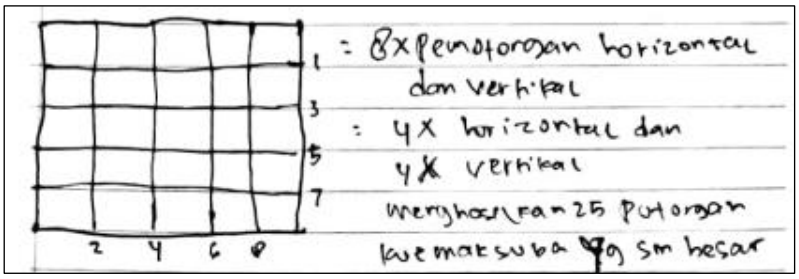

Figure 3. PA's Answers

Based on PA's work in Figure 3, it can be seen that indicator 1 is fulfilled. The student is able to apply many types of symbols and numbers related to basic mathematics in order to solve the question. Same as indicator 1, indicator 2 is also fulfilled. It can be concluded that the student is able to analyze information by representing it in various forms. The student makes the right model by drawing a square. Then, the student makes horizontal and vertical lines to determine the number of cuts. Indicator 3 is seen after getting the answer. This shows that the student is able to interpret the analysis result in order to make a prediction and decision. Finally, the student is able to decide that to produce 25 slices of cakes needs 8 cuts.

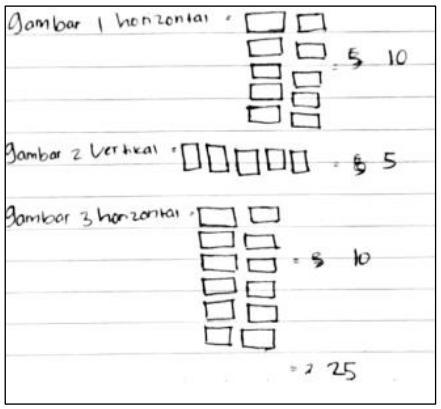

Figure 4. ZM's Answers

Based on ZM's work in Figure 4, it can be seen that indicator 1 is fulfilled. The student is able to apply many types of symbols and numbers related to basic mathematics in order to solve the question. Same as indicator 1, indicator 2 is also fulfilled. It can be seen through information analysis shown by the number of models. The student provides the right model by drawing several rectangles. However, indicator 3 is not seen in the ZM's answer. This shows that student is not able to interpret the analysis in order to make a prediction and decision. The student is not able to make decision that to produce 25 pieces of cakes needs 8 cuts.

Second Question

The second question given is still about uncommon question for numbers subject. Students are instructed to solve the question based on the way they want.

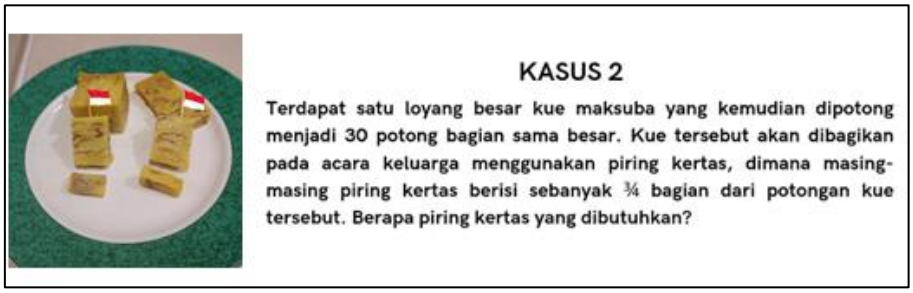

Figure 5. Second Question

Figure 5 is the first question given to the 3 students. It is about numbers subject and the students are asked to solve it using their own ways. The following is one of the students' answers.

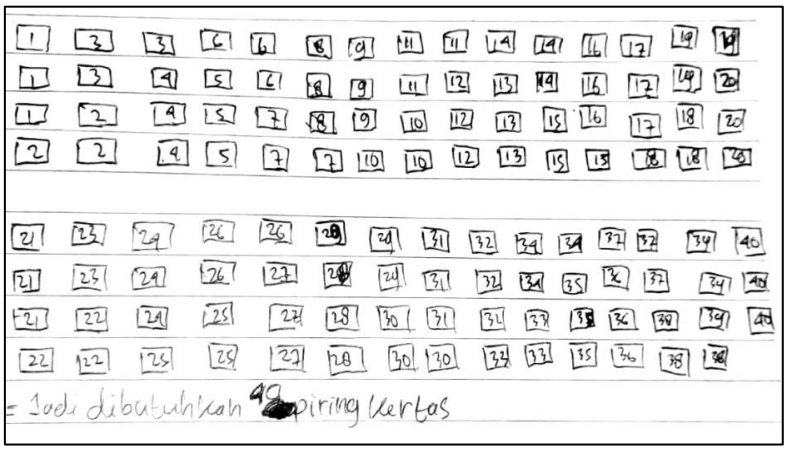

Figure 6. TB's Answers

Based on the results of TB's work in Figure 6, it can be seen that indicator 1 is fulfilled. The student is able to apply applies many types of symbols and numbers related to basic mathematics in order to solve the question. Same as indicator 1,

indicator 2 is also fulfilled. It can be concluded that the student is able to analyze the information shown in various models. The student provides the right model by drawing 30 rectangles which are then divided into 4 parts. Then, the student gives the same number in every ¾ part of each rectangle made. Indicator 3 is seen after getting the answer. This shows that the student is able to interpret the analysis result in order to make a prediction and decision. The student is able to decide that 40 paper plates are needed.

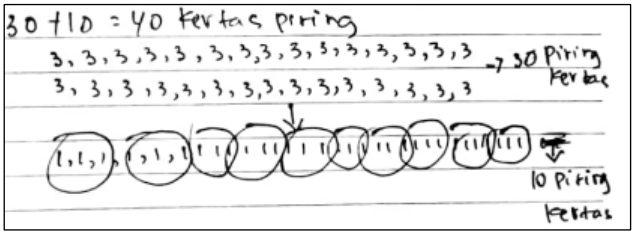

Figure 7. PA's Answers

Based on the result of PA's work in Figure 7, it can be seen that indicator 1 is fulfilled. The student is able to apply applies many types of symbols and numbers related to basic mathematics in order to solve the question. Same as indicator 1, indicator 2 is also fulfilled. It can be seen that the student is able to analyze the information shown through various models. The student provides 3 rows of numbers consisting 30 numbers. Then, the student writes down 30 numbers and 1 is as the remainder of each part. Indicator 3 is seen after getting the answer. This shows that the student is able to interpret the analysis result in order to make a prediction and decision. The student is able to decide that 40 paper plates are needed.

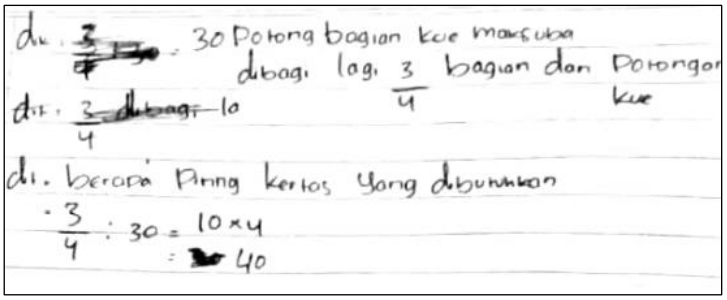

Figure 8. ZM's Answers

Based on the ZM's work in Figure 8, it can be seen that indicator 1 is fulfilled. The student is able to apply applies many types of symbols and numbers related to basic mathematics in order to solve the question. Indicator 2, same as indicator 1, is also fulfilled. This shows that the student's answer is in formal form. The student answers the question formally by directly performing fraction operations. Indicator 3 is seen after getting the answer. This shows that the student is able to interpret

the analysis result which is intended to make a prediction and decision. The student is able to decide that 40 paper plates are needed.

Discussion

The revealed result of the use of context is two out of three students are able to answer the questions given even though the questions are uncommon that are rarely encountered by the students. Based on the implied result, it can be concluded that the *Maksuba* cake context in numbers subject improves students' understanding to get the aim of questions given because the use of context that is familiar to students is believed to be able to support students' understanding increase (Pangaribuan et al., 2021). After having the interview, the reason of one of the students is not able to answer one of the questions is because the student is in rush. This is in line with Putri's opinion (2018) that uncommon questions are more complex so that the way to solve them cannot appear directly.

Conclusion

In accordance with the research result, the conclusion is obtained regarding to the question application in the *Maksuba* cake context that is able to bring out student's numerical skills deeper. By using the context known, the students are able to solve the questions given. The indicators that often appear are the use of many types of symbols and numbers related to basic mathematics subject to answer questions in different types of contexts occurring in everyday life (indicator 1) and analyzing the information shown in different types of models (diagrams, charts, tables, graphs, etc.) (indicator 2). Meanwhile, the indicator that does not appear frequently is to interpretate the analysis resulted in order to make a prediction and decision (indicator 3). The suggestion for the next researchers is to provide longer time allotted for uncommon questions.

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