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Using the Context of Pempek on the Algebraic Form Operation for Jumping Task

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Abstrak

Jumping task merupakan bagian dari proses pembelajaran di LSLC. Selain itu, Jumping Task juga merupakan bagian inti dari pengajaran yang menggunakan Higher Order Thinking Skills (HOTS) dan di Indonesia, Kurikulum 2013 menekankan pada pembelajaran menggunakan HOTS, dan konteks kehidupan sehari-hari. Penelitian ini bertujuan untuk mengetahui karakteristik *jumping task* yang valid, praktis, dan juga berguna untuk mendukung pembelajaran operasi bentuk aljabar siswa sekolah menengah menggunakan PMRI dalam konteks pempek. Subjek penelitian ini adalah siswa kelas 7 sekolah menengah di Palembang. Penelitian ini menggunakan PMRI sebagai konten materi dan konteksnya. Penelitian ini menghasilkan *jumping task* yang valid dan praktis pada mata pelajaran matematika operasi bentuk aljabar. Selain itu, dengan menggunakan konteks pempek pada *jumping task*, siswa dapat mempelajari operasi bentuk aljabar.

Kata Kunci: *Jumping Task,* PMRI, Operasi Bentuk Aljabar

Abstract

Jumping task is a part of learning process on LSLC. Moreover, Jumping Task as the central part of teaching that uses Higher Order Thinking Skills (HOTS) and in Indonesia, The 2013 Curriculum emphasizes learning using HOTS, and the daily life context. This research aimed to find out the characteristic of jumping tasks which valid, practical, and also useful for supporting secondary school students learning algebraic form operation using PMRI with the context of pempek. The subject of this research was seventh-grade students of secondary school in Palembang. This research uses PMRI as the content materials and contexts. Results of this research are valid ant practical jumping tasks on mathematucs topic algebraic form operation. Moreover, using context of pempek for jumping task, students can learning algebraic form operation.

Keywords: Jumping Task, PMRI, Algebraic Form Operation

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INTRODUCTION

Algebra is one of the main subjects of learning in seventh grade junior high schools based on the 2013 curriculum. Algebra is very important to learn and understand because it is a basic subject. Halim, Ruroto, & Soerjono (2013) say that algebra is the basic material for students to be able to understand top level material so students must understand and like algebra. In accordance with Permendikbud number 37 2018 which is to say students must be able to explain algebraic forms and perform algebraic forms of operations such as subtraction and addition.

Although the subtraction and addition operations in algebra look easy, many students still have difficulty understanding the concept of operations in algebra. As said by Alfiliansi, Ismaimuza, & Rochaminah (2014) which is one of the causes of students' difficulties in performing reduction and summation operations on algebraic forms, namely the lack of student understanding in interpreting the symbols contained in algebra. Likewise expressed by Karuniawati (2016) said that students had difficulty in understanding operations, the concept of algebra and making mistakes in calculations.

Hasibuan (2015) says that students understand better to understand variables, constants, syllables, by making a diagram to separate syllables, variables, and constants when children have difficulty doing arithmetic operations. According to Sari (2017) PMRI is in line with mathematics learning in the 2013 curriculum which emphasizes the process of finding knowledge carried out by students where students are given the opportunity to develop all potentials such as affective, cognitive and psychomotor aspects. The PMRI approach is an approach that is consistent with the 2013 curriculum where mathematics must be close to students and relevant to students' real life situations, (Putri, 2013).

The 2013 curriculum suggest teachers guide students in learning mathematics to achieve the 21st-century skills or termed 4C(Collaboration, Communication, Critical Thinking and Creativity (Putri & Zulkardi, 2018; Putri,2018). According to Arifin (2017) that the creation of effective learning can be applied with Lesson Study which can improve the quality of learning. Lesson Study is an activity not only paying attention to the teacher teaching, but also students like how students learn in class (Sato, 2014). Compared to conventional mathematics learning, the results of Lesson Study students' learning achievements are better applied as shown in the research of Atmojo, Umami, and Suyono (2013).

Learning activities among students such as interaction, dialogue and effective collaboration can be created by jumping task (Sato, 2014; Nofrion, 2012). To achieve 21st-century skills, jumping task can improve the quality of learning by helping students to participate by emphasizing problem-based learning(Putri & Zulkardi, 2019). Using problem of jumping task can develop students'high-level thinking skills (Sato, 2014; Sato & Sato, 2003). According to jumping task using context of *kain jumputan* on the fractional operation (Saskiyah, 2019).

Therefore, the purpose of this paper is to produce jumping tasks using PMRI with the context of *pempek* on algebraic form operation which valid and practical in supporting junior high school students at the seventh-grade learning HOTs mathematics in Palembang.

METHODS

This research uses design research as the method with the type of development study. This developmental research is a type of research aimed to producing jumping tasks in learning mathematics addition and subtraction of algebraic forms in seventh-grade of junior high school which is valid and practicial. This research focused on two stages, namely preliminary stage and formative evaluation that consisted of self-evaluation, prototyping (expert reviews, one-to-one, and small group), and field test (Zulkardi,2006; Zulkardi, 2002; Kurniawan, Putri, Hartono, 2018). The subjects of this research are seventh-grade students of junior high school in Palembang. Data retrieval is done using walkthrough, observation, documentation, and interviews.

Researchers produce jumping task in the preliminary stage. When the self-evaluation phase, the researchers evaluated and reviewed the initial prototype to go to prototype 1. In the expert review phase, expert validate prototype 1 with assess, observe, and evaluate that jumping task. The expert evaluated prototype 1 in terms of content, constructs, and language. After that, researcher review jumping task before one-to-one phase. Then, the researchers conducted a one-to-one phase for 3 students who had high, medium, and low abilities. The one-to-one phase is useful to see the clarity/readability of students to solve the problem. From expert reviews and one-to-one phase, prototype 1 will produce a valid prototype 2.

Prototype 2 will be tested in the small group phase. Prototype 2 tested 6 students who had different abilities (low, medium, and high) in small group phase. The small group phase is used to see the practicality of prototype 2. This small group phase would be produced by prototype 3 that valid and practical.

RESULTS AND DISCUSSION

The study was conducted with three students in the one-to-one phase and six students in the small group in junior high school and they are who had low, medium, and high abilitie. This research has done 3 of the 4 stages of design research development study type, namely expert reviews, one-to-one, and small group.

Preliminary

At the preliminary phase, With the help of the teacher, the researcher got three students for one to one and six students for the small group selected based on their level of mathematical ability

Next, the researchers analyzed the curriculum and determine the characteristic indicators of the problem achieved. This research is implementation of learning process used LSLC system, Because the implementation of learning process uses LSLC, the researchers make the problem and PUTRI jumping task is the central part of teaching uses higher order thinking skills (HOTS) so the researchers will show more specific characteristics regarding jumping tasks.

In jumping tasks, the researchers develop the problem using real-life context by pempek. This jumping task problem is associated with algebraic form operation content. The jumping task contains pempek problem which would be asked how much is needed for ground fish and sago to make more than 100 pempek. Besides, analyze what will happen to pempek if added ingredients. The content of the problem used in jumping task is algebaric form operations with the prediction of the level was 4 and 5 (according to HOTS difficulty level).

Formative Evaluation

Self evaluation

In the self-evaluation, the researchers evaluate and review the prototype that content, construct, and language. The problems of jumping task that has been made is examined and evaluated by researchers. The results obtained from this phase are prototype 1 which would be tested by expert review and one-to-one. In the self-evaluation phase, researchers made problems and that results are prototype 1 which would be tested by expert review and one-to-one phase. That problems can be seen in figure 1.

Figure 1. Jumping task problem before revision

Expert review and one-to-one

After going through the self-evaluation stage,to see that jumping task was a valid problem, the researchers conducted an expert review and one-to-one phase. The expert review stage is validated by SS (from Indonesia). Experts will evaluate and assess the jumping task regarding the constructs, content, and languages of the problems.

After with expert reviews, jumping tasks will be tested through the one-to-one phase. At this phase, jumping tasks tested by three seventh grade students who have different abilities. The three students are MS (low ability), DD (medium ability), and MM (high ability). The three students were asked to collaborate in solving the problem. Besides, that students was asked about opinions and comments about that problem. The aims are to see the response, obtacles, and understanding of students in understanding the problems in jumping tasks. The comments/suggestions from experts and students and the jumping task revision decision in table 1.

Tabel 1. Comments/suggestions from expert and students

Validation	Comments/Suggestions	Revision
SS	1. That problem was good, but sentence is used is not appropriate. 2. The answer will lead to division not to addition and subtraction of algebra. If use that,	1. Change sentence a and b to into sentences that are easy to understand. 2. Change number that is used in question to number that can not to divided.

Validation	Comments/Suggestions	Revision
	students was given scaffolding to directing to algebraic forms. 3. Add a sentence "Based on that information, then resolve to the next problem"	3. "Deficiency" in question b changed to be added.
Students	1. Students think that question a, just needed one hundred *pempek*.	

That problems has been changed based on the validation of the expert and also comments and suggestions from students. That was can be concluded that prototype 2 is valid. Turner (2000) said validator's assessment validated jumping task based on the content, constructs, and language, and also based on students' responses, constraints, and understandings from the one-to-one phase regarding clarity and readability of the problem . Valid prototype 2 is shown in Figure 2.

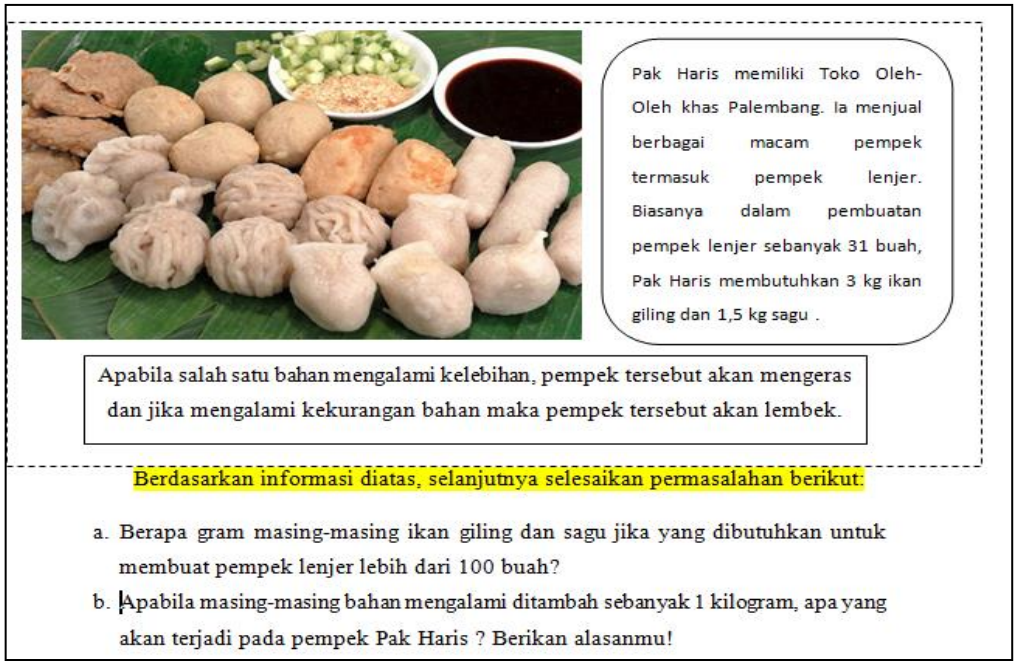

Figure 2. Jumping task problem after revision expert review and one-to-one

Small group

The small group phase aims to see the practicality of problem in jumping tasks to students. The researchers tested 6 seventh grade students with different abilities in the learning process for problem of jumping task. The students consisted of MAP(low ability), AA(low ability), MA(medium ability), MAJ(medium ability), ODG(high ability), and MK(high ability) An example of an answer from one of the students in the small group stage is shown in Figure 3. Before students answer question, students was given scaffolding algebraic form operation.

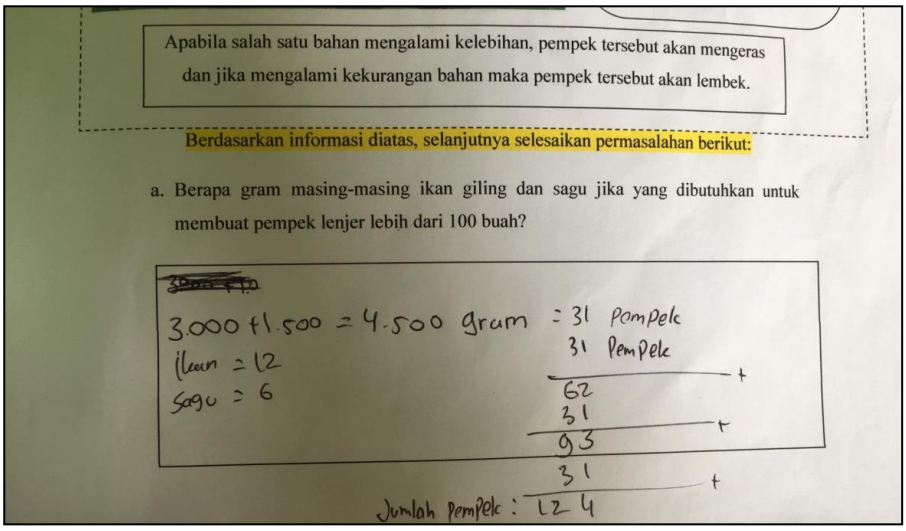

Figure 3. MAP's Answer in question a

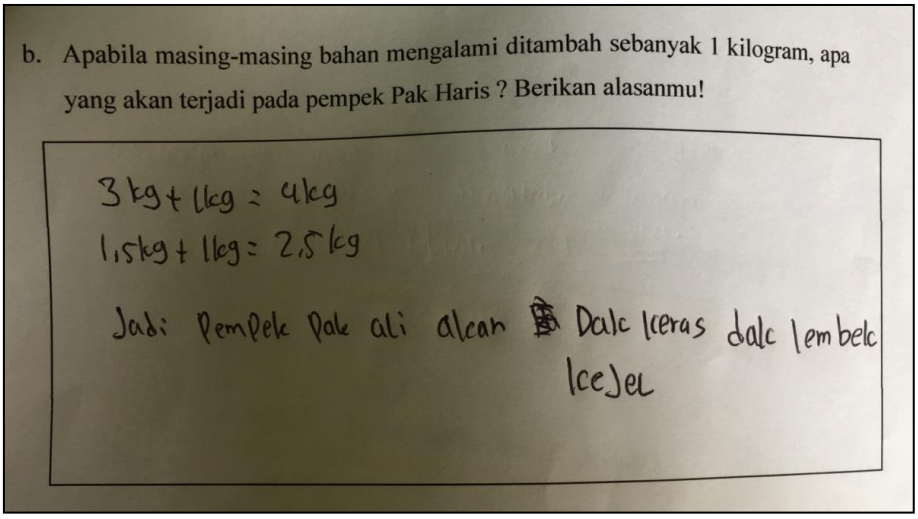

Figure 4. MAP's Answer in question b

Figure 3 and figure 4 shows how MAP solved that problem. Before answer that question, all students didn't understand of problem on jumping task because they have not yet learned it and the researcher gave a sharing task to make students get understand concept of addition and subtraction algebraic form. MAP can not to solved question b, but just OGD can solved it. However, MAP asked for help by saying "please teach me" to OGD, so that MAP could understand that problem about *pempek* (Sato, 2014; Sato, 2014; Sato & Sato, 2003).

Based on the students' results from the small group phase, it can be concluded that students answer it correctly and can understand the problem.students can be collaborative and can help the other students solve the problem by implementing in real form of jumping task. In the small group phase, there is no revision for prototype 2 and produse a valid and practical prototype 3.. Practicality can be seen while students can understand the problem in jumping tasks and can answer the problem correctly (Zulkardi, 2006; Zulkardi, 2002).

CONCLUSION

The researcher has produced a jumping task using the context of *pempek* on mathematics at the topic of a algebraic form operation which valid and practical. Validity can be seen from expert opinion about rounds of content, construct, and language as well as from student comments from the one-to-one phase and the practicality of the small group phase, it can be seen when the students understand the problems in jumping tasks and answer the problem correctly.

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