VALIDITY OF E-MODULES FOR TEACHING FRACTIONS THROUGH REALISTIC MATHEMATICS EDUCATION WITH THE CONTEXT OF SACRIFICE WORSHIP (IBADAH KURBAN)

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Artikel info

Abstrak

Fraction is one of the difficult topic for students. One way to reduce students' difficulties is to implement Realistic Mathematics Education (RME) by integrating Islamic values such as Sacrifice Worship (Ibadah Kurban). In addition, the use of technology to integrate sacrificial worship in fraction learning is also expected to increase students' interest in learning in the 21st century and can improve students' understanding. Therefore, it is necessary to develop an e-module for learning fractions through RME with the context of Sacrifice worship. The developed e-module contains learning trajectories, live worksheets, videos, and post-tests. This type of research is research and development which follows the stages of Plomp, especially in the prototyping and assessment stages. The instruments in this study were validation sheets. The validators consisted of one mathematics education lecturer and two Banda Aceh City junior high school teachers. Based on the validity test it was concluded that the e-module meets the valid criteria. The implication of this research is the development of e-modules needs to be continued to test practicality and effectiveness.

INTRODUCTION

Fractions are a basic mathematical concept (Getenet & Callingham, 2021). Fractions can predict later achievement in higher mathematics such as algebra. However, learning fractions is a challenge for students (Li et al., 2022; Purnomo et al., 2019). Several studies show that fractions are a difficult concept for elementary school and middle school students (Adu-gyamfi, Schwartz, Sinicrope, & Bosse, 2019). There are several aspects that influence students' understanding when studying fractions, such as students' knowledge of whole numbers (Sun, 2019), the mathematics assignments given by the teacher (Wahyu, Kuzu, Subarinah, Ratnasari, & Mahfudy, 2020), and the complexity of the fractions themselves (Obersteiner & Tumpek, 2016).

One way to improve students' mathematical understanding of fraction material is by integrating it with an Islamic context. Learning mathematics in an Islamic context can stimulate students to be able to connect mathematical topics with events or problems faced in daily life in carrying out worship (Ulpah & Novikasari, 2020). To integrate Islamic values in mathematics learning, it is necessary to design a learning trajectory that guides students from everyday Islamic problems to abstract mathematical knowledge (Muslimin et al., 2020). One approach that can be applied is the Realistic Mathematics Education approach (Johar, Zubainur, Khairunnisak, & Zubaidah, 2021). With RME-based instructional design, teachers can guide students to rediscover mathematical concepts as they progressively mathematize their mathematical activities (Treffers, 2012). The integration of Islamic values in mathematics learning through RME is expected to increase students' understanding. For this reason, media is needed that utilizes technology in the era of industrial revolution 4.0. One of them is the E-module. E-modules are teaching media that can be developed through software that displays image illustrations, audio, video, and others (Winatha & Abubakar, 2018). The use of learning media in the form of e-modules also helps students' learning process become more active and skilled in problem solving (Setiyani et al., 2022). E-modules increase learning effectiveness, learning independence thus minimizing teacher guidance and evaluation of their own learning (Syahroni et al., 2016). Learning fractions through RME with an Islamic context presented in the e-module is expected to help students learn independently without the help of a teacher, then students can measure their level of understanding through the activities provided in the e-module.

Several studies have been carried out regarding the development of e-modules that are integrated with Islamic contexts (Nafiah, 2020; Berlin, Apriliaswati, & Rezeki, 2021; Fahmi, Yusuf & Muchtarom, 2021). However, there is no e-module through realistic mathematics education with an Islamic context. Therefore, it is necessary to develop an E-module that provides information about faith, sharia or morals, which is related to mathematics, especially fractions. Based on the previous explanation, the problem formulation in this research is "What is the quality of the e-module for Teaching Fractions through Realistic Mathematics Education with the Context of Sacrifice Worship (Ibadah Kurban)"?

METHODS

The research method used in this research is the research and development (R&D) method with the Plomp development model which consists of three development stages, namely the initial investigation stage, the prototype stage, and the assessment stage. This

research only discusses validation results. The validity of the RME E-module with the sacrificial context on fractional material was tested the three validators. The validators consisted of one Ar-raniry State Islamic University mathematics education lecturer and two Banda Aceh City junior high school teacher. The validity criteria for the e-module developed are as follows (Khabibah, 2006).

Table 1
Validity criteria for e-modules

Criteria	Average
Very valid	$4 \leq KV^a < 5$
Valid	$3 \leq KV < 4$
Less valid	$2 \leq KV < 3$
Invalid	$1 \leq KV < 2$

aAverage validation results from experts on e-module.

Table 1 shows that if the data validation results are proven to be valid or very valid, then the learning tools that have been developed will be suitable for use and testing in the field. However, if the validation results show that it is less valid or invalid, then the learning tool must be revised again.

RESULTS AND DISCUSSION

The results should be clear and concise. The results should summarize (scientific) findings rather than providing data in great detail. The results can be presented in figures, tables, and texts. The discussion or analysis of the findings is not enough to just state that it relates to prior studies. The Discussion should be an interpretation of the results rather than a repetition of the Results. The discussion links the data and analysis results with the problem or research objective and a broader theoretical context.
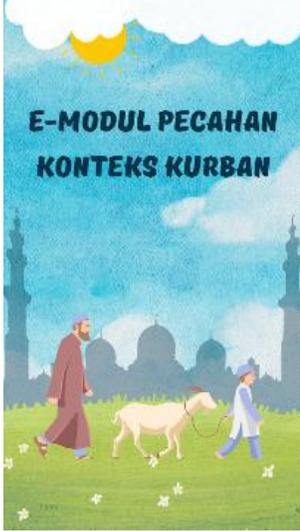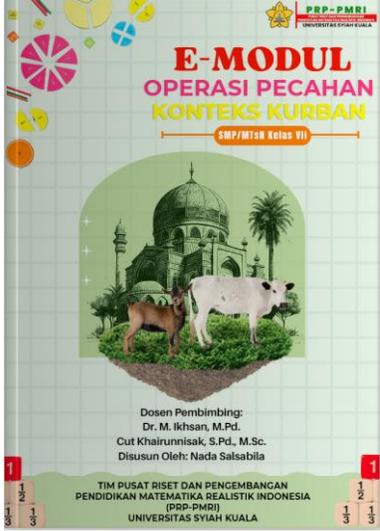
Table 2
Results of Validation of E-Modules by Experts.

Assessment Aspects	Average	Criteria
1. Presentation of e-module components		
a. Suitability of the materials in the e-modules with Learning Outcomes.	4.33	Very valid
b. Clarity of learning objectives on each Student Worksheet (LKPD) which is presented using a Live worksheet.	4.66	Very valid
c. The activities in the Live worksheets follow the principles of Realistic Mathematics Education (RME), namely starting with aproblem that is real and challenging for students	4.66	Very valid

and then followed by activities that guide students to draw conclusions.		
d. The activities in the Live worksheets are arranged based on the levels of thinking presented in the iceberg, namely situation, model of, model for, and formal knowledge.	5	Very valid
e. The video illustrations in the e-modules make students hooked, interested, and challenged to learn and reason.	3.66	Valid
f. The activities in the Live worksheets require students to reason.	4.33	Very valid
g. Suitability of image illustrations in the Live worksheets with student characteristics.	4	Very valid
2. Suitability of the materials	4.66	Very valid
3. Video content and display	3.33	Valid
4. Presentation of the Live worksheets	3.66	Valid
5. Language	4	Very valid

Table 2 shows that the validity of the e-module for each aspect is very valid and valid. Thus, the designed e-module can be used with slight revisions. Based on the results of the validation carried out by three validators, there are several suggestions for improvement. The validator suggested that the cover title needs to be changed, there should be instructions for using the live worksheet and video, and problems in the live worksheet need to be fixed so that sentences do not have double meaning. Ambiguous sentences have more than one meaning so they can cause ambiguity. So that the sentences composed can be well received by the reader, the sentences must use good and correct Indonesian, standard and in accordance with PUEBI (Riswati, 2015). Several examples of e-module revisions are presented in Table 3.

Table 3
Revision of Aspects of E-Modules

Before Revision	Validator Improvement Suggestions and Comments	After Revision and Conclusion
	Suggestions from experts in the cover section need to be added to the sentence "E-module for operational fractions in the sacrificial context". and there are also slight changes to the E-module cover design.	
	Section for E-LKPD instructions for adding sentences: -Watch the following video before working on the E-module	

Pada hari Raya Idul Adha umat Islam diperintahkan untuk melaksanakan kurban. Hewan yang dikurbankan adalah tanda ketaatan kepada Allah SWT dan kesiapan untuk mengorbankan harta yang telah dititipkan dalam rangka menjalankan perintah-Nya. Namun tidak hanya itu, setelah disembelih daging kurban ini akan dibagi-bagikan kepada orang-orang yang membutuhkan, sehingga pemilik kurban juga berbagi dengan sesama melalui ibadah kurban. Oleh karena itu, kurban juga mengandung makna bersedekah keduanya memiliki kaitan yang erat. Tidak hanya tentang berkurban fisik, tetapi juga tentang berbagi kasih dan kepedulian kepada sesama. Bersedekah adalah bentuk nyata dari pengorbanan dan cinta, yang dapat memberikan dampak positif dalam kehidupan orang lain

Aktivitas 1

Bu Sarah menerima daging kurban dari mesjid seperti gambar di bawah.

Sebelum dimasak daging tersebut dibagi menjadi empat bagian. Sebanyak $\frac{1}{2}$ bagian dimasak daging semur dan $\frac{2}{4}$ bagian dimasak dendeng.
a. Bagaimana cara kamu menentukan berapa bagian daging yang diambil untuk dimasak?

Wacana 1

Pada hari Raya Idul Adha umat Islam diperintahkan untuk melaksanakan kurban. Hewan yang dikurbankan adalah tanda ketaatan kepada Allah SWT dan kesiapan untuk mengorbankan harta yang telah dititipkan dalam rangka menjalankan perintah-Nya. Namun tidak hanya itu, setelah disembelih daging kurban ini akan dibagi-bagikan kepada orang-orang yang membutuhkan, sehingga pemilik kurban juga berbagi dengan sesama melalui ibadah kurban. Oleh karena itu, kurban juga mengandung makna bersedekah keduanya memiliki kaitan yang erat. Tidak hanya tentang berkurban fisik, tetapi juga tentang berbagi kasih dan kepedulian kepada sesama. Bersedekah adalah bentuk nyata dari pengorbanan dan cinta, yang dapat memberikan dampak positif dalam kehidupan orang lain

Pojok info!

Hukum melakukan Qurban adalah Sunat Muakkadah artinya ibadah ini tidak wajib namun sangat dianjurkan untuk dilakukan.Kurban nazar dan kurban sunah adalah dua jenis kurban yang memiliki tujuan dan syarat yang berbeda dalam agama Islam.
1. Kurban Nazar: Kurban nazar adalah jenis kurban yang diberikan sebagai wujud pemenuhan janji kepada Allah SWT.
2. Kurban Sunah: Kurban sunah adalah kurban yang dianjurkan, tetapi tidak wajib dalam Islam. Kurban ini dilakukan sebagai tindakan ibadah yang dianjurkan oleh Nabi Muhammad SAW sebagai tindakan kebaikan dan ketundukan kepada Allah.

Advice from experts is to add an "info corner" regarding sacrifice in the E-LKPD section with the aim of deepening students' understanding of the concept of sacrifice.

Suggestions from material experts require adding the words "discourse 1" in the E-LKPD stimulus section.

"Pak Andi menyembelih 1 ekor kambing yang disembelih di musala dekat rumah Pak Andi. Setelah disembelih dan dipotong berat daging dan tulang kambing tersebut adalah 15 kg. Berdasarkan kesepakatan maka daging yang telah disembelih diberikan kepada orang-orang miskin.

Wacana 2

Pak Andi melaksanakan kurban pada hari Raya Idul Adha tahun ini. Pak Andi berkurban 1 ekor kambing yang disembelih di mushalla dekat rumahnya. Setelah melalui proses penyembelihan dan pemotongan, berat total daging dan tulang kambing adalah sekitar 15 kg. Daging yang telah disembelih akan dibagikan kepada fakir miskin dan untuk pak andi sebagai pihak yang berkurban juga bisa mengambil dan memakan sebagian daging kurban .

Advice from E-LKPD material experts on multiplication of fractionsabout technical issues (writing) so that they can be looked at further. The writing and positioning of sentences are adjusted

to the readability level of junior high school students so that they are easier to understand and understand by users of this E-module.

• Sentence: "Mr Andi sacrificed 1 goat which was slaughtered in the prayer room near Mr Andi's house. After slaughtering and cutting the weight of the goat's meat and bones is 15 kg. Based on the agreement, the meat that had been slaughtered was given to the poor" changed to "Mr Andi sacrificed 1 goat which was slaughtered in the prayer room near his house. After going through the slaughtering and cutting process, the total weight of the goat meat and bones is around 15 kg. The meat that has been slaughtered will be distributed to the poor and Pak Andi, as the person making the sacrifice, can also take and eat some of the sacrificial meat.

b. Bagaimana cara kamu menentukan berapa bagian daging yang diambil untuk dimasak? Jawaban: Berdasarkan jawaban pada aktivitas 1b, buatlah sketsa dan nyatakanlah dalam bentuk pengurangan pecahan! Jawaban: Jawaban:	Suggestions from material experts for activity 1 on the E-LKPD for multiplying fractions in the section for the word "sketch" add the word "(image)" next to it so that it is easier for students to understand and comprehend.	**Aktivitas 1** Berdasarkan wacana 1 Bu Sarah menerima daging kurban dari mesjid seperti gambar di bawah. Sebelum dimasak daging tersebut dibagi menjadi empat bagian $\frac{1}{4}$ Sebanyak bagian dimasak daging semur dan $\frac{1}{2}$ bagian dimasak dendeng. a. Bagaimana cara kamu menentukan berapa bagian daging yang diambil untuk dimasak? Jawaban: **Pojok info!** Penyembelihan hewan qurban hendaknya dilakukan pada hari Raya Idul Adha (tanggal 10 Zulhijjah) dan hari Tasyrik (11,12,13, Zulhijjah) dalam Kalender Hijriah. Dan penyembelihan hewan qurban yang dilakukan setelah terbitnya matahari
Aktivitas 2 Pada saat hari Raya Idul Adha, Bu Ani memberikan $\frac{1}{2}$ bagian kue bolu kepada 3 orang panitia kurban. Selanjutnya setiap orang mengambil $\frac{1}{3}$ bagian dari $\frac{1}{2}$ bagian untuk dimakan. Berapa banyak kue bolu yang diambil oleh setiap orang ? Jawaban:	Suggestions from material experts for activity 2 to improve sentences so they don't have double meaning. in the sentence: On Eid al-Adha, Mrs. Ani made 1 sponge cake. Then, he gave 1/2 of the sponge cake to 3 people on the sacrificial committee. Next, each person takes 1/3 of the 1/2 portion to eat. How many pieces of sponge cake does each person take? Becomes a sentence: On Eid al-Adha, Mrs. Ani made 1 sponge cake. Then, he gave 1/2 of the sponge cake to 3 people on the sacrificial committee. Next, each person takes 1/3 to eat. How many pieces of sponge cake did each person take?	**Aktivitas 2** Pada saat hari Raya Idul Adha, Bu Ani memberikan $\frac{1}{2}$ bagian kue bolu kepada 3 orang panitia kurban. Selanjutnya setiap orang mengambil $\frac{1}{3}$ bagian untuk dimakan. Berapa banyak kue bolu yang diambil oleh setiap orang ? Jawaban:

E-modules are one of the teaching materials that can help students in learning. Teaching materials in the form of e-modules provide advantages over printed module materials because students are given the opportunity to repeat learning material independently as needed (King & Robinson, 2009). Improvements to the e-module ensure that the material presented can be well understood by the target learner and the media used can support learning effectively. Fraction e-modules with Sacrifice Worship context contain live worksheets, videos, geogebra to make learning more fun and attract students' interest in learning. Well-designed teaching materials will motivate students to learn well (Ariyanto et al., 2018; Oktaviana et al., 2015). Apart from that, This e-module is said to be valid because it uses the RME approach, a learning approach that combines theory with the reality of everyday life. Applying this approach not only makes learning more relevant, but also encourages student interest, because the material studied is closely related to their life experiences. Teaching materials and independent learning resources in the form of interactive e-modules based on the RME approach can make students more enthusiastic in learning and understanding the material provided by the teacher (Subekti & Prahmana, 2021; Zakiyah et al., 2019).

E-module material on fractions through RME with the context of sacrificial worship is important to develop Islamic context-based learning materials are suitable for use in learning and can be used as learning support to increase students' mathematical understanding (Ulpah & Novikasari, 2020). In this way, students' understanding of fraction material can increase and knowledge of Islamic values in the context of sacrificial worship will be embedded in students. Apart from that, students are happier in learning because they can solve problems that are closer to the students' world (Purwanti, 2012). E-modules can be used by teachers in the teaching and learning process in the classroom. This research is the initial part of the model development stage (Plomp & Nieveen, 2010) which is part of priminary research at the expert validation stage. It is hoped that future researchers can continue the development stages.

CONCLUSION

Based on the results and discussion of the development of the Fraction learning e-module through realistic mathematics education in the context of sacrificial worship, it meets the criteria for validity and is suitable for use. However, the e-module RPP needs to be further tested for its practicality and effectiveness.

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