



Designing Social Arithmetic Learning Media Using Smart Apps Creator (SAC)

Mohammad Rifqi Romdhoni^(✉), Eka Nurmala Sari Agustina, and Nurina Ayuningtyas

STKIP PGRI Sidoarjo, Sidoarjo, Indonesia
rifqirromdhoni14@gmail.com

Abstract. Based on the results of interviews conducted by researchers with a mathematics teacher at a junior high school in Sidoarjo, it was found that students still had difficulty understanding the topic of social arithmetic, especially discounts. Students often misunderstand the concept of discount. One of the reasons is the absence of interactive learning media that allows students to study the topic of discounts independently and interactively. This study aims to design interactive learning media based on android applications on social arithmetic material with the help of the Smart Apps Creator (SAC). Developmental research method by Thiagarajan was carried out comprising three stages namely needs analysis, design, and validation. The results of the analysis of the needs of learning media show that there is a need for learning media that can provide opportunities for students to understand the topic of discount independently and interactively. The design of learning media developed by researchers is an android application-based learning media that contains learning videos whose plot is determined based on students' understanding of the topic of discount and several practice questions. The results of the validity test obtained an average value of 3,96 which signify valid learning media. Several improvements were suggested, such as adding several features and adding practice questions with a higher level of questions.

Keywords: Development · Interactive Learning Media · Android · Social Arithmetic · Smart Apps Creator (SAC)

1 Introduction

Based on the results of interviews conducted by researchers with a mathematics teacher at a junior high school in Sidoarjo, it was found that students still had difficulty understanding the topic of social arithmetic, especially on discounts. Social arithmetic is a mathematical science that is used to solve problems in life-related to the economy such as trade, banking, and taxation [1].

Anggraeni and Fitriana [2] states that one of the difficulties students experience when studying the topic of discounts are a lack of accuracy in understanding the concept and answering the questions. This difficulty is shown in the errors of students' answers when working on questions on discounts, especially in determining the final price of items that receive discounts in percentage form.

According to [3], learning media can make it easier for students to understand learning materials. According to [4] learning media can provide opportunities for students to learn and apply the concept of discounts in real life. Thus, the learning media can help students to understand and present real conditions related to this topic.

Interactive learning media is one type of learning media that can provide opportunities for students to learn independently [5]. In addition, to providing opportunities for students to study independently, interactive learning media can significantly influence on student learning outcomes [6]. Interactive learning media can be displayed in various forms, one of which is displayed using a smartphone. Smartphone is a portable communication tool [7]. Thus, the learning media displayed through smartphones becomes more interactive, practical and easy to use.

Learning media displayed through smartphones can be developed with various applications, one of which is Smart Apps Creator (SAC). Smart Apps Creator is an application that can develop learning media without the need for programming knowledge, and the appearance of SAC is easy to understand [8]. So that SAC can convey information between teachers and students visually.

Based on the opinions of several experts and the importance of overcoming the difficulties experienced by students in learning arithmetic material, especially discounts, this study aims to design interactive learning media based on android applications on social arithmetic material with the help of Smart Apps Creator (SAC).

2 Methods

This study aims to design interactive learning media based on android applications on social arithmetic material with the help of Smart Apps Creator (SAC). The learning media is developed using the development model developed by [9] comprising of three stages namely needs analysis, design, and validation.

The needs analysis stage is carried out in several stages as follows: (a) determining the main problems related to learning media and probable solutions the problems, (b) identifying student characteristics related to learning media, (c) identifying skills that students will acquire after using learning media, (d) identifying the concepts that will be taught to students through learning media, (e) identifying clear and measurable goals from the learning media.

At the design stage, the researchers designed the learning media with the consideration of the following aspects: (a) the design of the features of the learning media, (b) the design of the content of the learning media, and (c) the design of the display of the learning media. In the validation stage, the learning media will be assessed by four validators using an instrument adapted from [10]. This instrument marks the learning media on three aspects namely format, contents, and language, with a score ranging from 1 to 5. The validation test results were calculated using the formula adapted from [11] as follows:

$$\bar{x}RV = \frac{\sum \bar{x}AP}{n} \quad (1)$$

The average score is then analyzed and matched to the criteria for the validity of the learning media based on the category adapted from [11] as follows (Table 1).

Table 1. Criteria for the Validity of Learning Media

Average Learning Media Validation	Criteria Validity of Learning Media
$4 \leq \text{validity of learning media} \leq 5$	very valid
$3 \leq \text{validity of learning media} < 4$	valid
$2 \leq \text{validity of learning media} < 3$	barely valid
$1 \leq \text{validity of learning media} < 2$	invalid

3 Result and Discussion

3.1 Needs Analysis

Based on the results of interviews, it was found that currently there is no interactive learning media that provides opportunities for students to understand mathematics topics independently. Students were also found unable to understand the topic of social arithmetic, especially discounts. According to [5], interactive learning media can provide opportunities for students to learn independently. So that if students cannot understand the explanation from the teacher at school, they can re-learn the topics by themselves. Interactive learning media can also have a significant influence on student learning outcomes [6]. The interview also reveals that the students at the school prefer if the teacher explains the material using the help of learning media.

Based on the interview, it was decided that through the media, the students will learn the concept of discount. They were also expected to acquire skills related to solving problems related to the topic.

Based on the previous description, the purpose of this research is to develop valid interactive learning media and can be used by students to learn independently about the topic of discounts.

3.2 Design

Learning media is designed using Smart Apps Creator (SAC). The learning media developed has the name KEMA, an acronym for Kelas Matematika. KEMA has 2 features, namely topic and exercise. The topic feature contains learning videos related to the topic of discounts, whose flow is determined based on students' understanding of the topic of discounts. The exercise feature contains practice questions related to the topic of discounts. Visually, KEMA has several displays as follows: (a) initial display of the application, (b) title screen display, (c) main menu display, (d) material menu display, (e) material display, and (f) practice questions display.

The initial screen of the application contains the main title of the application, namely "KEMA". The title screen display includes the main title of the application and a single "play" button, which directs the user to the main menu view. The initial appearance of the application and the title screen display are shown in Fig. 1.

The main menu display consists of two buttons called "Latihan" which direct the user to the practice question view, and "Materi" which direct the user to the topic menu view. The main menu display is shown in Fig. 2.

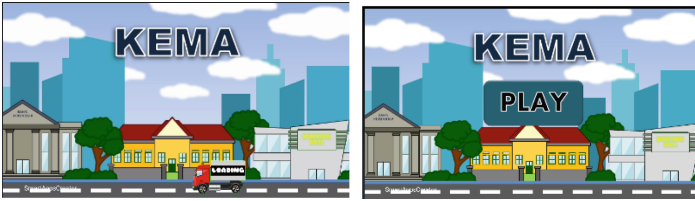


Fig. 1. Application start screen (left) and title screen display (right).

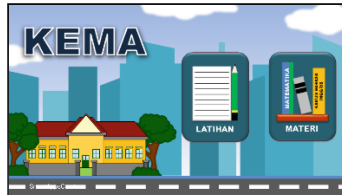


Fig. 2. Main menu display

The topic menu display contains several buttons that leads to the each of the content. The content view includes a learning video viewer screen and several help buttons. The topic menu display and content display are shown in Fig. 3.

The display of practice questions contains multiple choice questions and the display of the final score obtained by the user after working on the available multiple choice questions. The display of the practice questions is shown in Fig. 4.



Fig. 3. Topic menu display (left) and content display (right)



Fig. 4. Display of practice questions

3.3 Validation

The learning media design was then assessed by four validators. The results are shown in the following Table 2.

Based on the table above, the average result of the four validators is 3,96 with valid criteria with a slight improvement in learning media. From the table, it can be seen that the validation results of the learning media got the highest points in the content aspect. So that this is in accordance with the function of learning media, which is to present the topics to be studied carefully and thoroughly [3].

The validators also suggested several improvements, which can be seen in the following Table 3.

Table 2. The results of the validation of learning media

Aspect	Validator	Score	Average
Format	1	3,66	3,83
	2	3,33	
	3	3,66	
	4	4,66	
Contents	1	4,5	4,31
	2	3,5	
	3	4,5	
	4	4,75	
Language	1	3,5	3,75
	2	3,5	
	3	4	
	4	4	

Table 3. Suggestions for Improvement from Four Validators

Validator	Improvement Suggestions
1	Naming the application according to the topic discussed in the application
	Adding a back sound to the main menu and material menu
2	Added a back button on each content view
3	Adding the purpose of using the application
	Added application usage instructions
	Added a button that can go straight back to the main menu
4	Add practice questions

The most important suggestions lie in improving features that can make it easier for students to use learning media. Thus, the results of these improvements can meet the requirements of interactive learning media, making it easier for users to use them [5].

Based on the suggestion, we made several improvements. First, we changed the name of the learning media from “KEMA (Kelas Matematika)” to “PARIS (Pembelajaran Aritmatika Sosial)”. The title was changed to show that the learning media only focuses on social arithmetic topic, namely discounts. The appearance of these improvements is shown in Fig. 5.

Second, we added video tutorial instructions for using learning media before the main menu display appears. The display of these improvements is shown in Fig. 6.

Third, in the content display view, we added a button with an arrow icon that returns to the topic menu view. The display of these improvements is shown in Fig. 7.

Four, we included a button with a question mark icon that displays the purpose of using learning media. The display of these improvements is shown in Fig. 8.

Last but not least, we also added back sound to the main and topic menu, as well as some more practice questions.

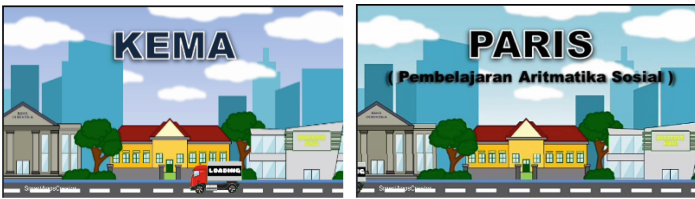


Fig. 5. Display before (left) and view after revision (right)

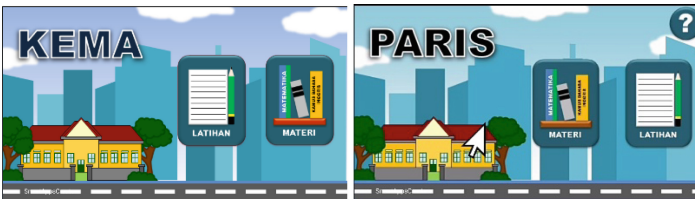


Fig. 6. Display before (left) and view after revision (right)



Fig. 7. Display before repair (left) and view after repair (right)

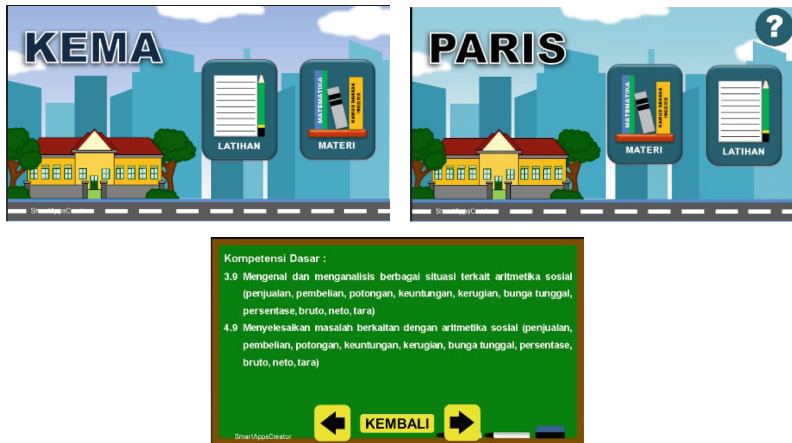


Fig. 8. Display before repair (top left), display after repair (top right), and display containing the purpose of using learning media (bottom)

4 Conclusion

As the students still have difficulty in understanding the topic of discount, an interactive learning media is developed with the help of Smart Apps Creator. The interactive learning media is based on android and contains two features, namely topic and exercise. The topic feature contains learning videos related to the topic of discount whose flow is determined based on students' understanding of the topic of discount, while the exercise feature contains practice questions. The media comprises several displays namely initial application display, title screen display, main menu display, material menu display, the material display presented with video, practice question display. The results of the validation assessment carried out by four validators shows that the interactive learning media on the topic of social arithmetic which is based on android applications and developed with the help of Smart Apps Creator, is marked "valid" with minor improvements. This research will continue to the trial phase involving students.

References

1. A. As'ari, M. Thohir, E. Vaentino, Z. Imron and I. Taufiq, *Buku Guru Matematika*, Jakarta: Kementerian Pendidikan dan Kebudayaan, 2017.
2. R. Anggraeni and A. Y. Fitrianna, "ANALISIS KESULITAN SISWA DALAM MENYELESAIKAN SOAL ARITMATIKA SOSIAL SELAMA PANDEMI COVID-19," *Jurnal Pembelajaran Matematika Inovatif*, 2021.
3. Rohani, *Media Belajar*, Sumatra Utara: Universitas Islam Negeri Sumatra Utara, 2019.
4. R. Susilana and C. Riyana, *MEDIA PEMBELAJARAN: Hakikat, Pengembangan, Pemanfaatan, dan Penilaian*, Bandung: CV. Wacana Prima, 2009.
5. A. Ripai, *Media Pembelajaran Teori dan Praktik*, Cirebon: IAIN SNJ, 2015.
6. N. Nurmawati, L. R. Masduki, E. Prayitno and M. Y. R. Dartani, "The implementation of interactive multimedia in improving mathematics learning outcomes," *ETERNAL (English Teaching Journal)*, 2020.

7. S. Melumad and M. T. Pham, "The smartphone as a pacifying technology," *Journal of Consumer Research*, 2020.
8. A. R. Azizah, "Penggunaan Smart Apps Creator (SAC) untuk mengajarkan global warming," *Prosiding Seminar Nasional Fisika*, 2020.
9. Thiagarajan, "Instructional development for training teachers of exceptional children: A sourcebook.," *ERIC*, 1974.
10. Y. Yamasari, "Pengembangan media pembelajaran matematika berbasis ICT yang berkualitas," *Seminar Nasional Pascasarjana*, 2010.
11. R. Rahmatin and S. Khabibah, "PENGEMBANGAN MEDIA PERMAINAN KARTU UMATH (UNO MATHEMATICS) DALAM PEMBELAJARAN MATEMATIKA PADA MATERI POKOK OPERASI BILANGAN BULAT," *Jurnal Ilmiah Pendidikan Matematika.*, 2016.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

