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The Development of Android-Based Learning Mobile App to Practice Critical Thinking Skills for Elementary School Students

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Abstract

Today's increasingly rapid technological developments do not only appear in the field of communication but are also needed in education. In the education field, it is expected to instill students with adequate knowledge and critical thinking skills, which are needed for their future. Practicing critical thinking skills can be done with mobile applications because today's students are highly familiar with gadgets. In terms of education, students need a learning platform that is equipped with audio, images, and easy-to-understand text. To accommodate this, an Android-based application was designed to provide learning steps, such as analyzing, obtaining information, asking questions, and making conclusions. This study is a qualitative descriptive study using the ADDIE (analyzing, designing, developing, implementing, and evaluating) method. It includes material analysis, application design with smart apps creator (SAC), testing by media and materials experts, and overall evaluation. The trial of this application was carried out on 3rd-grade elementary school students with questionnaires and interviews. Based on the validation process by IT experts and elementary school teachers, the development of the situation-based learning (SBL) App was considered valid. In other words, this application was properly designed according to the development of lower-grade students. Furthermore, the students were interested in SBL App and found it easier to obtain information, come up with good questions, and draw conclusions from a material using the app. Therefore, it can be concluded that the SBL App developed in this study is feasible and effective to be used as an Android-based learning application to train elementary school students' critical thinking skills.

Keywords: Critical Thinking Skills, Elementary School Students, Android-Based Learning, Mobile App

Introduction

The COVID-19 pandemic has brought many changes to the world, especially in education and children. To facilitate online learning, many parents buy gadgets for their children, which allows them to spend a lot of time with their gadgets. This will indirectly bring about a change in habits in their world. That is, a world filled with high curiosity (Isrokatun, Hanifah, & Maulana, 2018).

With many elementary school students owning personal gadgets, it is inevitable that they are becoming more familiar with the internet, YouTube videos, TikTok videos, Google Play Store, various Android-based applications, and the likes (Isrokatun, Yulianti, & Nurfitriyana, 2021). Therefore, education must be able to take on the challenges and opportunities that come with this phenomenon to be able to accompany children's digital activities. Education also has an important role in directing them when interacting with their gadgets. There are many Android-based applications on the Google Play Store, from games to educational and learning applications, such as Ruang Guru, multiply & division, division table, integer calculator, and many others.

Education is required to instill students with adequate knowledge, skills, and good character. This is a future educational framework that aims for students to be able to compete and create innovations. In the framework, one of the skills that need to be continuously trained is higher-order thinking skills, such as critical thinking skills. This ability can be applied by involving all the senses and optimizing all abilities to solve the problems presented in the learning process. According to Bruner, as cited in Lieung (2019), the opportunity to explore knowledge will strengthen memory retention and train higher-order thinking skills. Critical thinking allows students to examine problems in an integrated and structured way, formulate innovative solutions, and reflect on them.

Critical thinking is a process that culminates in making logical conclusions or decisions about what to believe and what actions to take (Ennis, 1991). In addition, critical thinking is a

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form of self-introspection and makes people sensitive to their situations (Splitter, 1991). Therefore, critical thinking can be defined as a process of self-introspection that makes a person sensitive to a situation, which leads to logical conclusions or decisions about what to believe and what actions to take in order to determine a good solution.

The function of education is divided into conservation and innovation (Dewantara, 1967; Herlambang, 2018). The innovation function means that education is based on the development of science and technology as a preparation to face life in the future (Kryukov & Gorin, 2017). Additionally, the innovation function is a continuity of current learning demands and the balance of digital learning media development. Current learning, otherwise known as 21st-century learning, is oriented toward critical thinking and problem solving, creativity and innovation, cross-cultural understanding, media literacy, information and communication skills, computing and ICT literacy, and life and career skills (Bishop, 2006). It is the importance of critical thinking and the development of ICT that serve as the basis of why the SBL App is needed.

The situation-based learning (SBL) model is a novelty and the SBL App is developed to fulfill the need to train critical thinking skills for elementary students. This model sees that the things around us can become problems that can later be investigated and solved. They can then be incorporated into the practice of critical thinking skills by studying the situations. In the SBL model, the teacher creates a learning situation that can raise questions from students, and then the students solve problems that they have posed. In doing so, the SBL model trains students' problem posing skills, which will later affect their critical thinking skills. The SBL model consists of four stages of the learning process, namely creating situations, posing problems, solving problems, and applying the concepts (Aqilah, Isrok'atun, & Jayadinata, 2017).

The advantages of the SBL model in theory and practice are outstanding, especially at the elementary school level. Aningsih and Putri (2019, p. 61) state that the advantages of the SBL model include: 1) increasing students' awareness of mathematical problems; 2) making students more active in participating in learning activities; 3) training students to be more sensitive and aware of problems in their environment from the situation presented; 4) allowing students to collect information from a situation before posing a problem; 5) training students' problem posing skills; 6) encouraging students to solve the problems that have been posed; 7) increasing students' learning motivation; and 8) training students' mathematical creative problem solving skills.

Developed in several stages, the SBL App serves as a platform that actualizes the SBL model. Specifically, the app facilitates the students in the observing and problem posing stages. This application is a mobile platform that makes it easier for students to analyze situations that often occur in their environment and helps to improve their problem posing skills. In addition, this application also provides a variety of situations with various levels of difficulty equipped with a discussion of the situations presented. The SBL App also has a voice feature that makes it easy for students to use it.

Research by Isrokatun, Syahid, Putri, Julia, and Sunaengsih (2019) found that situation-based learning can improve students' critical thinking and problem posing skills. Then, because the internet is easily accessible for students, they are more skilled in using Android-based applications. While it is important to be skilled in using technology, students' critical thinking skills are still important to prepare for their future life.

This study is conducted to answer the challenges of today's era where technology such as Android-based applications are very close to the lives of elementary school students. To do so, the study developed an Android-based application that implements the SBL model using SAC. Ultimately, the study aims at answering the following research questions.

1. How are elementary school lower grade material conceptualized?
2. What are the results of the SBL App validation?
3. How is the SBL App developed?
4. What are the results of the SBL App product trial?
5. How is the SBL App uploaded to Google Play Store?

How do students respond to the SBL App?

Literature Review

Situation-Based Learning

According to Tarek et al. (as cited in Isrok'atun & Rosmala, 2018, p. 134), situation-based learning is a new approach that is quite strong and flexible in creating a constructivist learning paradigm. In the SBL model, the teacher creates a learning situation that can raise questions from students and the students solve the problems they pose (Aqilah et al., 2017). Therefore, the SBL model can be defined as a model that facilitates student learning with constructivism theory. Based on this understanding, the SBL model creates a learning climate for students to explore things they want to know based on the problems they encounter until they are able to solve the problem and form new knowledge based on real experience.

In the SBL model, the teacher is designing the situation for the learning process. The situation presented by the teacher is made to provide a stimulus for the students to practice their thinking skills at a higher level. In line with this, Isrok'atun and Rosmala (2018, p. 134) suggest that the presentation of situations in the SBL model is carried out by the teacher as a stimulus for students to carry out learning activities. Through a given situation, students are able to identify mathematical problems, understand them, and solve them. At its foundation,

the purpose of the SBL model is to train students' critical thinking skills that manifest in the form of problem posing, problem understanding, and problem solving. When presented on a digital platform, namely in the SBL App, it will be able to provide the same essence. Students' critical thinking skills will be trained by analyzing and finding the right information and formulating the right questions.

In its implementation, the SBL model consists of several structured stages for a successful learning process. According to Isrokatun et al. (2019), the four stages include creating the situation, problem posing, problem solving, and applying the concepts. What follows are the explanations of each stage (Fgure 1).

Creating the Situation Stage. This stage is the first step in implementing the SBL model. At this stage, the teacher's role is to create a situation that can stimulate students to carry out learning activities. In this case, the situation presented can be in the form of pictures or descriptions that facilitate students to observe/analyze the teaching material. The situation created by the teacher is adapted to everyday life so that it can raise many questions that must be resolved (Isrok'atun & Rosmala, 2018). The teacher designs the situation as interesting as possible so that the students are interested in exploring some important information based on it. The given situation is designed in stages, where the teacher can start from a simple situation to a more complex one.

Problem Posing. This stage is the core stage of the SBL model. Problem posing is a process of creating problems through real cases based on experience. Problem posing includes creating new problems or developing problems based on existing data or information. Problem posing ability can be defined as the activity of generating or reformulating a given problem, tasks that appear on the spectrum between common problems and complex problems, and metacognitive behavior in the problem posing process (Baumanns & Rott, 2021).

Problem posing can be indicated in the form of teacher-initiated dialogue and follow-up questions, learning experiences from the past, and friends in the same group learning to pose various problems (Hill, Bass, & Stewart, 2020). In this stage, students are trained to express the things they want to know based on the situation given by the teacher. The problems that arise are expressed in the form of questions that are formed from the students' understanding of the situation. In this stage, it is expected that the questions raised by the students vary from low to high levels, including unsolved problem questions, easy questions, and problem-solving questions. Through this questioning activity, students will be triggered to pay more attention to the situation. Brown and Walter (2005) state that asking a problem or question will potentially make students understand the learning material better than if they are asked to answer questions from the teacher.

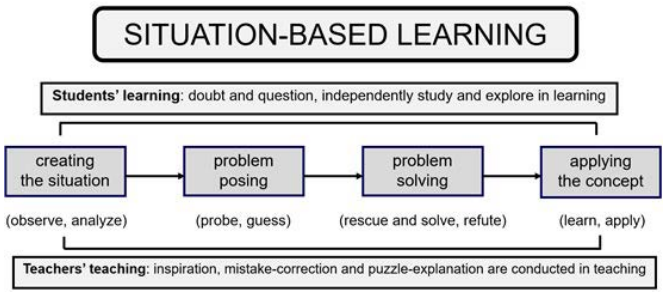

Fig. 1: Stages of SBL Learning

In problem posing, students are guided to formulate or pose problems or questions based on the situation given by the teacher. To pose a problem, students must think and reason, create and communicate mathematical ideas, work together and argue in formulating and solving the problem with their friends, use available information to solve the problem, and think of the most appropriate and reasonable way to solve the problem. Furthermore, the characteristics of problem posing are students as learning subjects, prioritizing students' potential in problem solving, and providing challenges for students in each lesson. For that reason, problem posing provides opportunities for students not only to generate new problems from a given situation but also to reformulate the given problem and generate solutions (Guvercin, Cilavdaroglu, & Savas, 2014).

Problem posing learning has benefits for students to strengthen understanding of the subject matter, move from obtaining information to applying it in life, reach deeper levels of continuous thinking and critical reflection, and more easily identify the linkages between specific content, their own learning, and the skills they need in their daily lives (Nardone & Lee, 2010).

Problem Solving. This stage is the goal of the SBL model where students can develop strategies to solve problems that have been previously identified. The problem solving stage can be divided into four steps, including understanding the problem, developing a problem solving plan, making a resolution, and seeing the results and reflecting on them. In teaching and learning activities, this process has five steps: identifying problems, finding strategies, solving problems with strategies, writing down answers, and receiving feedback (Lee, Choi, & Kim, 2021; Polya, 1945).

At this stage, the teacher and students together determine the level of the identified problems and decide if they need to be followed up in the problem solving process. The problems/questions are sorted from easy to difficult levels. Furthermore, the problem solving stage means linking previous knowledge in solving new non-routine problems and generating new approaches using previous knowledge if the first attempt

fails in solving the problem. That is, the solution to each new problem activates relevant past experiences (Oksuz, 2009; Weisberg & Alba, 1981).

Applying the Concept. At this stage, the students are expected to learn and apply the concepts they find in their daily lives. Here, the students are trained to apply concepts that have been found in the previous stage to new or different problems or situations on relevant concepts (Isrok'atun & Rosmala, 2018).

In this stage, the students can build their understanding based on their learning activities in problem solving activities with different situations for both the teacher and students but still in the same concept. Students are invited to draw conclusions based on the facts found in the problem solving stage. In this case, the students describe the concepts they have to solve the newly discovered problems.

In this process, an inductive thinking process occurs, which is a way of thinking where conclusions are drawn from as many concrete facts as possible from the previous SBL stage. Inductive thinking, which starts from specific things to general ones, trains students to collect facts through observation so that they can gain knowledge.

Smart Apps Creator

As information and technology develop, education must be able to answer the challenges presented by technological developments. In the current era, the use of technology-based learning media has become a necessity and a demand (Muhson, 2010). Technology-based learning has been implemented in elementary schools. In addition, technology has also been widely used in Indonesia, especially smartphones. Almost everyone has a smartphone to facilitate their communication. Students begin to adapt to be able to use these communication tools. In education, these facts pose challenges and opportunities for teachers in carrying out the learning process in schools. Learning media is currently a necessity to motivate and increase students' interest in learning, especially during the ongoing COVID-19 situation. In practice, the development of mobile devices can be a way for teachers to take advantage of technology in the digital era (Abdul Karim et al., 2020).

Education is influenced by advances in science and technology. Future generations should be able to use technology so as not to be left behind by these advances. Android is an operating system for Linux-based mobile devices that includes an operating system, middleware, and applications. Android provides an open platform for developing and creating applications. Application development for Android can be made in several software programs, one of which is Smart Apps Creator.

Smart Apps Creator (SAC) is an application for creating Android and iOS mobile applications without the need for programming code, which can produce output in HTML5 and .exe formats (Rachman, 2021). This makes it easier for users to create teaching material content. SAC can be used to create attractive multimedia learning mobile apps. It can also be used offline or online according to the developer's needs in producing products that can be used anytime and anywhere (Azizah, 2020). SAC can be enriched with interesting animations to increase students' motivation and interest in learning. The specifications required to use SAC are also not too heavy, namely a minimum of 2 GB of RAM and an operating system of Microsoft Windows XP, Vista, 7, 8, or 10.

According to Azizah (2020), some of the advantages of SAC include:

a. Easy to make designs as desired and attractive as possible.
b. The application does not require a programming language.
c. The application can be used to create materials and quizzes for learning purposes.
d. Can run without an internet connection.

SBL App

Developed in several stages, the SBL App serves as a platform that actualizes the SBL model. Specifically, the app facilitates the students in the observing and problem posing stages. This application is a mobile platform that makes it easier for students to analyze situations that often occur in their environment and helps to improve their problem posing skills. In addition, this application also provides a variety of situations with various levels of difficulty equipped with a discussion of the situations presented. The SBL App also has a voice feature that makes it easy for students to use it (Isrok'atun, Rosmiati, Khoerunnisah, & Rohman, 2021).

Evidently, the SBL App does not cover all stages of the SBL model. Specifically, the problem solving stage has not been presented in the SBL App. Additionally, the applying the concept stage is not present in the SBL App, but this stage can still be done in the implementation of understanding the material. Nevertheless, the SBL App is still capable of being a mobile app-based learning media that can be used for 21st-century learning.

In the 21st century, technology has an important role in our daily lives. Technological devices play an important role in helping students and educators to get more benefits from them (Kumar Basak, Wotto, & Bélanger, 2018, p. 194). E-learning is learning supported by digital electronic tools and media, M-learning is E-learning using mobile devices and wireless transmission (Hoppe, Joiner, Milrad, & Sharples, 2003, p. 225), and digital learning is any type of learning facilitated by technology or by instructional practices that make effective use of technology that occur in all learning areas and domains. SBL App is considered M-learning because it uses a mobile device.

Method

Research Design

This study is a qualitative descriptive study using the ADDIE (analyzing, designing, developing, implementing, and evaluating) method to design an Android-based SBL App product using SAC (Isrokatun et al., 2019; Sugiyono, 2016). The process includes material analysis, app design, app development, and implementation for elementary school students to evaluate the success of the app development process. The use of the descriptive method in this study aims to describe the development of the SBL App and summarize the outcome of using the SBL App.

Analyzing refers to the activity of defining teaching materials for elementary school students and analyzing several situations that are easy to analyze and in accordance with the indicators of critical thinking skills that are used as content in the SBL App. This was done so that it can be ensured that the content of the teaching materials can train critical thinking skills. Designing refers to designing applications using SAC to find the application design format as the initial design form of the application. Developing refers to the activity of developing an application design based on the SBL model with material content for lower grades. The developing step also includes validation of the application, namely material validation and media validation. Implementing refers to product testing activities on a limited basis among elementary school students, in which the test results are processed for the next activity, namely evaluating. Evaluating refers to the activity of evaluating the application based on the results of the limited trial, taking into account all inputs to revise and improve the design of the SBL App. The flow is presented in Figure 2..

Upon development, the next step was to upload the SBL App to the Google Play Store to realize the usability and usefulness of this application as a learning medium that can train students' critical thinking skills and make it more widespread.

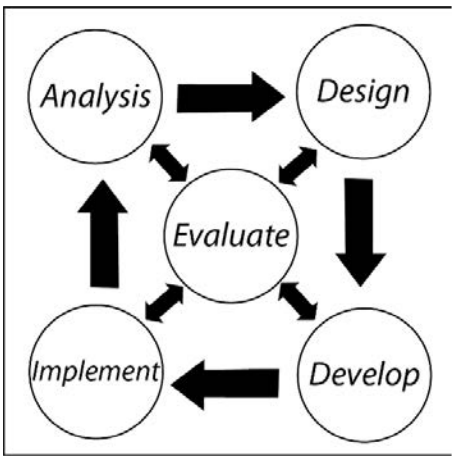

Fig. 2. ADDIE Framework

Concepting Lower Grade Elementary School Materials

The first step taken in developing this SBL App was to conceptualize the lower grade thematic material for elementary school. This step was started by analyzing some of the material that can be presented on a digital platform. The analysis considered the learning indicators to be achieved by the students. After identifying the material to be included in the SBL App, references to several situations/images relevant to the material were collected. The consideration in creating the situation here was the suitability of the characteristics of lower grade elementary school students. This includes high curiosity and their thinking skills that are still developing from understanding concrete concepts to abstract concepts. It is not ideal to force them to observe and understand vague images. Therefore, images that were contextual and could be analyzed well in each situation were sorted out.

Moreover, the discussion presented in the SBL App was enriched with material taken from several thematic books issued by the Ministry of Education and Culture for elementary schools. Some of the situations presented were also based on the thematic book references. Therefore, the materials discussed in the SBL App were in accordance with the needs of elementary school students. The material discussed in the SBL App included sentences of praise, the life cycle of living things, environmental conservation efforts, simple addition, Pancasila symbols, and angle material.

Application Design Using SAC

Figure 3 presents the initial overview of the SBL App design concept.

Material Validation and Media Validation

The material validation was carried out by two material experts, namely an elementary school teacher as an elementary school material expert and an IT expert. Likewise, the media validation was also carried out by two media experts, namely

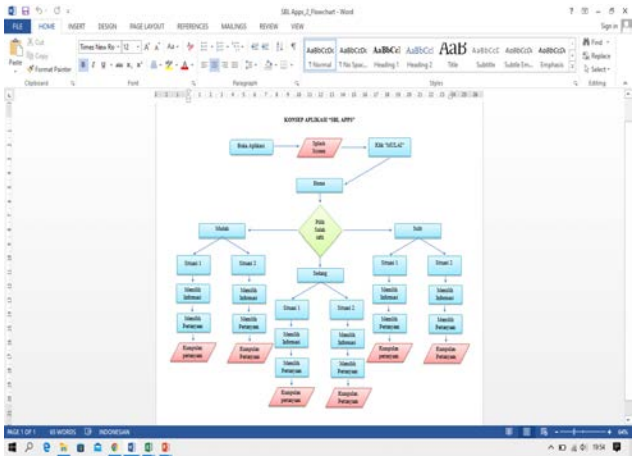

Fig. 3. SBL App Concept Flowchart

an elementary school teacher as an elementary school learning media expert and an IT expert. The results of the validations served as inputs and corrections for the initial design of the SBL App.

Product Trial

After the material and media validations and the product has been declared valid, a limited trial of the SBL App product was carried out. The trial was conducted on students of SD Negeri Citimun 1 with a total of 16 people. In the implementation of this trial, inputs and comments from users were accommodated for the initial design of the SBL App.

Upload on Google Play Store

After the validation by media experts and material experts, adequate results were obtained based on the limited trial of the SBL App. The positive comments and ease of use of the SBL App made this application compatible to use for training students' critical thinking skills. Following that, the last step was uploading the SBL App to the Google Play Store to realize the usability and usefulness of this application as a learning media to improve students' understanding and train their critical thinking skills.

Results and Discussion

Concepting Lower Grade Elementary School Material

The thematic materials for lower grade students comprised a combination of subjects, including Indonesian language, Civics, Arts and Crafts, and Mathematics. The materials were also loaded with attention to their physical and psychological development; starting from the use of easy-to-understand sentences to the hierarchical arrangement of material and the elaboration of concepts that must be detailed to build complete student knowledge.

Table 1: Material Validation Results

IT Expert				
No.	*Criteria*	*Score*	*Percentage*	*Average percentage*
1	Content Suitability Aspect	15	93.75 %	
2	Implementation Aspect	22	91.67%	93.47 %
3	Evaluation Aspect	19	95%	
Elementary school teacher				
1	Content Suitability Aspect	15	93.75 %	
2	Implementation Aspect	22	91.67%	93.47%
3	Evaluation Aspect	19	95 %	

Following that, pictures were presented to clarify the material by considering the surroundings of the students. This was done so that the students' concrete ways of thinking can be accommodated to understand the intent and purpose of the picture.

References used in the development of elementary school students' materials were compiled from thematic books published by the Ministry of Education and Culture. Indicators and competencies that must be achieved by students were also considered so that the materials developed were in line with them. Additionally, the materials were presented attractively to elementary school students. Epistemologically, students want to learn a concept in a short time. In other words, they do not like to spend too much time learning difficult and monotonous concepts(Yilmaz-Tüzün & Topcu, 2010).

Application Validation

On the validation process done by the IT expert and elementary school teacher, the product got a very high validation score. The aspects that were reviewed before being used more broadly were the suitability of the materials. In addition, the design, readability, and visual communication in the SBL App also got very high validation scores. The details can be seen in Table 1 and Table 2.

The development of Android-based learning applications will bring up new things in learning. Android-based applications that are easy to use and help present material more attractively will also facilitate students' learning effectively. The use of digital media for learning is more meaningful and efficient in conveying information and facts that tend to be difficult to achieve physically (Mourlam, Strouse, Newland, & Lin, 2019). The digital concept can also be more effective in showing objects (enlarge the small, reduce the large, bring close the far away, and show hidden objects).

SBL App Development

SAC is an application used to develop the SBL App. This software can be used offline or online. Its easy-to-operate

Table 2: Media Validation Results

IT Expert				
No.	*Criteria*	*Score*	*Percentage*	*Average percentage*
1	Design Aspect	15	93.75 %	
2	Readability Aspect	11	91.67 %	92.36 %
3	Communication Visual Aspect	11	91.67 %	
Elementary School Teacher				
1	Design Aspect	15	93.75 %	
2	Readability Aspect	10	83.33 %	92.36%
3	Communication Visual Aspect	12	100 %	

interface allows for more attractive application designs. The development of learning applications is a change from conventional media which is expected to have a good impact on creative learning. As emphasized by Rajpathak and Narsingpurkar (2013) and Mourtzis et al. (2016), conventional product development processes pave the way for newer and more powerful ways to ensure better results. Learning applications are developed to be marketed as readily available and accessible resources for technology-minded teachers and parents around the world (Chik, 2014).

The SBL App development process was divided into preproduction and production stages. The pre-production stage includes a) determining the topics/materials for the application from thematic books by the Ministry of Education and Culture while referring to the specified indicators, b) seeking complete references regarding the materials to be displayed, c) creating situations to be presented in the application, d) making answer choices to obtain information and make questions, and e) creating narrative instructions for each step in the application. Meanwhile, the production stage includes a) creating a background and determining the application display theme, b) adding situations that have been created according to the materials, and c) adding voice over to every step of the application, and d) developing the application using Smart Apps Creator. Some of the displays of the SBL App are as in Figure 4 to 7.

Fig. 4: SBL App Opening Screen

Figure 5. SBL App Level Selection Screen

In this stage, students can choose the level they want to try. Their options include easy, medium, and difficult levels. The levels represent the complexity of the materials and situations that must be solved at that stage.

Figure 6: Situation Selection Screen

This screen is displayed after the students select their desired level. On all the levels, the students must solve two situations that have been carefully selected to accommodate their contextual understanding relevant to their surroundings.

Figure 7: Information Selection Screen

In this step, the students are trained to analyze the picture. On the screen, there are also options of information and the students need to choose according to the accuracy of the information pieces. The information collected here has to align with the materials of the respective level. Analytical skills can train students to formulate new approaches to solve problems or interpret situations in new ways that are different from previous interpretations (Oksuz, 2009).

Figure 8: Question Selection Screen

This step trains the students to raise questions in accordance with information that has been obtained. In

other words, this step trains students' problem posing skills in their learning process by identifying and formulating their own problems and posing problems from problems that they have solved before (Silber & Cai, 2016). In addition, problem posing also has the goal and benefit to encourage students to read more materials/information relevant to the materials. Problem posing is a crucial supplement to problem solving, encourages students to be flexible, improves problem solving skills, and hones students' understanding of the learning materials (English, 1998, as cited in Baumanns & Rott, 2020.

Figure 9. Discussion Screen

The discussion screen appears last. This is aimed at making it easier for students to clarify their answers in previous steps. Additionally, the discussion step is also expected to help student construct their understanding according to the situation. This step is supplemented with pictures to aid students in their attempt to understand the materials.

Product Trial

The SBL App limited trial was done to understand the extent to which the application needs to be improved. The trial was conducted on lower-grade elementary school students, i.e. 16 third-grade elementary school students. In the trial, the students were given one chance to choose a level and complete the activities under that selected level. Teachers were involved in monitoring each step the students were taking to help them better understand and remember everything in the SBL App.

Following that, the students were invited for a discussion where they can give their feedback on the SBL App. The goal of the discussion was the betterment of the SBL App. From the discussion, the students felt the application lacked scores that reflect their correct and incorrect answers. They felt that this was important to motivate them in obtaining information and analyzing every choice they make in the SBL App.

Additionally, the students generally liked the SBL App due to its contextual pictures and meaningful discussions. In other words, the SBL App was able to provide a meaningful understanding that can be implemented well. Finally, the application interface and its audio feature left positive impressions on the students as they we considered helpful in helping the students understand the instruction in the applications. The data obtained from the questionnaire about feedback for the SBL App are as presented in Table 3.

Based on Table 3, students found the SBL App easy to use, so most of them did not need help in using it. Additionally, they found the instructions as well as the images and texts provided in the application were also clear and easy to understand.

Uploading the SBL App to Google Play Store

In the validation process by media and material experts, the SBL App was declared valid in terms of material and design. Following that, a limited trial was conducted on lower-grade elementary school students. From the trial, several positive and negative feedbacks were obtained regarding the SBL App. From the feedback, several things were improved to make the SBL App even better. The results of the latest development of the SBL App then include the steps of observing situations, selecting appropriate information, compiling appropriate questions, and discussing. Finally, to spread its benefits and make it easy for all people to use, especially teachers and elementary school students, the SBL App was uploaded to the Google Play Store. The SBL App can be accessed on the Google

Table 3: Students' Impressions Regarding the SBL App

		Strongly Agree		*Agree*		*Disagree*		*Strongly Disagree*		*Total*	
NO	*Question*	*Total*	*%*	*Total*	*%*	*Total*	*%*	*Total*	*%*	*Total*	*%*
1.	I feel that I need someone else's help in using the SBL App	2	12.5	4	25	10	62.5	0	0	16	100
2.	The instructions for use of the SBL App are not clear enough	1	6.25	1	6.25	11	68.75	3	18.75	16	100
3.	The picture of the situation is not clear enough to see	5	31.25	1	6.25	9	56.25	1	6.25	16	100
4.	The words used in the SBL App are difficult to understand	3	18.75	3	18.75	8	50	2	12.5	16	100
5.	The discussion in the SBL App is insufficient to explain the situation	4	25	1	6.25	9	56.25	2	12.5	16	100

Play Store via this link: https://play.google.com/store/apps/details?id=com.sblapps.smartapps

Student Responses to the SBL App

After the SBL App was validated by material and media experts, the app was implemented for elementary school students. The implementation process started with a presentation of the SBL App and instructions for its use. After that, students were given gadgets to try the SBL App in turn. For the implementation, the students tried one level on the SBL App until they were able to understand the discussion (Figure 10).

After using the application, the students were given a questionnaire that aims to understand their response to the SBL App. The data from the questionnaire are broken down into the following tables 4 and 5 .

From Table 4, it can be concluded that almost all respondents felt happy using the SBL App. They loved every step in the SBL App, such as compiling questions, finding information, and so on. Additionally, the respondents felt that the SBL App was easy to use and could be used in learning. Digital-based applications help teachers to be able to meet the needs of students according to their development (Kumar Basak et al., 2018) (Table 5).

Based on Table 5, critical thinking skills are increased by using the SBL App. Almost all respondents felt that the SBL App made it easier for them to explain, understand the material, and draw conclusions. This means that students will be more skilled in facing the challenges given in learning by using the SBL App. Critical thinking skills are very important for students not only as knowledge in education

Fig. 10: SBL App Implementation

Table 4: Data on Interest Response on the SBL App

		Strongly Agree		*Agree*		*Disagree*		*Strongly Disagree*			*Total*
NO	*Question*	*Total*	*%*	*Total*	*%*	*Total*	*%*	*Total*	*Total*	*%*	*Total*
1.	I find this application easy to use	13	81.25	2	12.5	0	0	1	6.25	16	100
2.	I like this app to use in learning	13	81.25	3	18.75	0	0	0	0	16	100
3.	I feel happy after using this app	15	93.75	1	6.25	0	0	0	0	16	100
4.	I like the selecting information section in this app	8	50	8	50	0	0	0	0	16	100
5.	I like the selecting question section in this app	13	81.25	3	18.75	0	0	0	0	16	100
6.	I like the discussion section in this application	12	75	4	25	0	0	0	0	16	100

Table 5: Students' Critical Thinking Skills

		Strongly Agree		*Agree*		*Disagree*		*Strongly Disagree*			*Total*
NO	*Question*	*Total*	*%*	*Total*	*%*	*Total*	*%*	*Total*	*Total*	*%*	*Total*
1.	By using the SBL App, I find it easier to give an explanation	13	81.25	3	18.75	0	0	0	0	16	100
2.	Using the SBL App helps me become more skilled in understanding the material	14	87.5	2	12.5	0	0	0	0	16	100
3.	I feel that using the SBL App can make it easier to draw conclusons	14	87.5	2	12.5	0	0	0	0	16	100

Table 6: Students' Problem Posing Skills

		Strongly Agree		*Agree*		*Disagree*		*Strongly Disagree*	*Total*		
NO	*Question*	*Total*	*%*	*Total*	*%*	*Total*	*%*	*Total*	*Total*	*%*	*Total*
1.	I feel the SBL App helps me to be able to ask the right questions based on the situation	14	87.5	1	6.25	1	6.25	0	0	16	100
2.	I feel the SBL App helps me to be able to ask the right questions based on the information that can be ext Racted	9	56.25	6	37.5	1	6.25	0	0	16	100
3.	I feel the SBL App helps me to be able to compose good question sentenc es	15	93.75	1	6.25	0	0	0	0	16	100

but also to become individuals who are involved in the developments in the community (Barnett, 2004; Moore, 2011) (Table 6).

Based on Table 6, the SBL App can train students' problem posing skills. This is because they feel the impact of using the SBL App, which can ask the right questions based on the situation and can make it easier to compose good question sentences. This is obtained by paying attention to several options in the SBL App.

In summary, the responses given by students indicate that the SBL App has positive outcomes. The application can train students' critical thinking skills with materials presented in a fun Android application. In addition, the easy use of the SBL App allows students to study independently. Thus, the SBL App can be used as an Android-based learning application to train the critical thinking skills of elementary school students. Cell phones are more familiar to students' lives compared to their parents. Therefore, introducing mobile technology into education adapts students' skills in the digital age (Crompton & Burke, 2015; Sun, Yao, You, Du, & Luo, 2018).

Conclusion

The validation results from media and materials experts show that the development of an Android-based application (SBL App) is appropriate for use by elementary school students. This is due to the coherent materials, communicative language, and the suitability of the existing information with the development of students that are present in the application. The learning media in this study was developed in Smart Apps Creator. After being implemented for elementary school students, the application generally received a positive response, both in terms of students' interest and in increasing their thinking skills. According to the students' responses, the SBL App can help them practice their critical thinking skills. After using the SBL App, the students felt that the application made it easier for them to formulate problems, collect data, analyze information, ask and answer questions, and draw conclusions. Thus, the SBL App can be an effective learning media to create quality students.

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