Development of Android-based Interactive E-Booklet to Maximize Critical Thinking Skills and Student Learning Motivation

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Abstract

This study aims to develop android-based interactive e-booklet to describe the characteristics of interactive e-booklet, analyze the validity of interactive e-booklet, and analyze user responses. This research method is development research with research design referring to 4-D design (define, design, development, and disseminate) which is modified to 3-D or only reaches the development stage, because the research was conducted during a pandemic. The results of this study are Interactive E-booklet which have five characteristics, namely (a) self-instructional, (b) self contained, (c) user friendly, (d) can provide critical thinking skills training for students during the learning process and evaluation, and (e) can help maximize students' learning motivation. The Interactive E-Booklet was declared very valid to be used, this was in accordance with the assessment of the experts with a validity achievement of 91.67% for the media aspect and 92,5% for the material aspect. The Interactive E-Booklet got a very good response from teachers and students with an average percentage of 92.5% for teacher responses and 86.77% for student responses. Based on these results, it can be concluded that Interactive E-booklet can help maximize critical thinking skills and students' learning motivation.

INTRODUCTION

Law Number 20 of 2003 states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the necessary skills. themselves, society, nation and state (Kemendikbud, 2013). It is stated in the law that one of the potentials that need to be developed in students is skills. And the rapid developments taking place in the 21st century have changed the way people learn, the meaning of social relationships, and the nature of the work one can do, so that mastery of 21st century skills is necessary.

One of the 21st century skill competencies according to Wagner (2010) is critical thinking skills or critical thinking skills. El Soufi (2019) reveals that critical thinking skills are very relevant today, given the rapid spread of information from various sources such as social media and also a new phenomenon, namely the abundance of fake news. Critical thinking skills are used to understand concepts, apply, synthesize, and evaluate the information obtained, so that it will produce information that can be used as knowledge and guides in action (Zubaidah, 2010). In education, teaching students to think critically is one of the main goals (Kaleiloglu, 2014), because as Paul's opinion is quoted by Hasruddin (2009) that optimizing students' critical thinking skills towards the use of language, subject matter, use of logical thinking structures , testing the truth of science, and experience from various aspects will have a positive impact and make students more independent.

One form of pedagogy that has the most potential in empowering critical thinking skills according to Zubaidah (2010) is to motivate students. The motivation that exists within a person will encourage; activate or move; and directing or channeling behavior towards goals (Anggraini, 2016). Learning motivation is directly proportional to critical thinking skills, as the results of research by Cholisoh et al. (2015) which shows that the average critical thinking skills of students with high learning motivation are better than students with low learning motivation.

However, the results of observations at MTs N 2 Kendal show that few students participate actively in learning and teachers have limitations in controlling online classes, so it is also difficult for teachers to observe students' critical thinking skills. In addition, the teaching materials and evaluation tools used do not contain aspects of critical thinking skills, and the presentation of the material is less varied, using only one textbook, teaching materials, and power points. This makes students' critical thinking skills less than optimal.

Based on these problems, it is necessary to optimize students' critical thinking skills and learning motivation, one of which is through the development of alternative teaching materials that are prepared by taking into account the aspects of critical thinking skills and learning motivation.

Interactive E-booklet can be used as alternative teaching materials. Booklets are small books containing information on certain topics of discussion (Mahendrani, 2015) which have criteria in the form of using short, simple, short, concise, and attractively packaged sentences (Hapsari, 2013). Interactive E-Booklet is an Android-based interactive application that does not only contain text or images, but also includes videos, activities, quizzes and evaluations that can be accessed via Android-based smartphones.

Based on the problems above, researchers are encouraged to conduct research on the development of Android-based Interactive E-booklet to maximize critical thinking skills and students' learning motivation. The purpose of this study is to describe the characteristics, analyze the validity, and analyze the responses of teachers and students to Android-based Interactive E-booklet in maximizing critical thinking skills and students' learning motivation.

METHOD

This research is a development research that refers to the research design according to Thiagarajan (1974), namely the 4-D design (define, design, development, and disseminate) which is modified into 3-D or only up to the development stage, because current learning The research is still ongoing in the era of the COVID-19 pandemic. The subjects of this study were 3 media expert validators, 3 material expert validators, 30 class VII students at MTs Negeri 2 Kendal, and 1 science teacher. Data collection techniques were carried out by, (1) interview method in the form of pre-research observation, (2) documentation method to determine research subjects and documentation, (3) questionnaire method for assessment of validators and teacher and

student responses. The research questionnaire was prepared using a Likert scale. Characteristic data obtained from the results of the analysis of the validity and responses of students. The validity data were obtained from the results of the validity analysis of media experts and material experts. User response data is obtained from the results of the analysis of teacher and student responses.

RESULT AND DISCUSSION

The development in this research is an Android-based Interactive E-Booklet that can be used as an alternative teaching material with Material Classification and Changes for class VII semester 1 in order to maximize critical thinking skills and students' learning motivation. This research was carried out in three stages according to the 4D development method, namely:

1. Define Stage (Defining)
a. Front end analysis

Front end analysis shows that the delivery of material is less varied and less interesting, that is, using only one textbook, teaching materials, and power points. In addition, it is known that the majority of students are android smartphone users and these devices are underutilized in learning.

b. Student analysis

The analysis of students shows the results that students tend to be passive, less enthusiastic in learning. In addition, in online learning, many students are late in sending their daily assignments and sometimes some students are constrained by the internet network.

c. Task analysis

The task analysis showed the results that the assignments contained in the media were in the form of formative tests and chapter final tests which were arranged based on the learning objectives.

d. Concept analysis

Concept analysis is carried out on the Material Classification and its Changes. This material has an integrated aspect, namely physics, biology, and chemistry, so this material requires a more detailed and contextual explanation. This material is also one of the basic concepts used to understand science at an advanced level (Iriyanti, 2012).

e. Specification of learning objectives

The purpose of learning in the Material Classification and Changes material is through learning activities assisted by Android-based Interactive E-booklet by instilling religious, critical, and disciplined attitudes, students are able to:

1) Classify the characteristics of matter.
2) Explain the difference between elements, compounds, and mixtures.
3) Describe the various properties of solutions.
4) Describe the different methods of separating mixtures.
5) Identify the application of mixed separation methods in everyday life.
6) Make a report on the results of experiments on the separation of mixtures.
7) Describe the physical and chemical properties.
8) Describe physical changes and chemical changes.
9) Identify physical changes and chemical changes in everyday life.

2. Design Phase (Design)
a. Media selection

The media chosen to be developed in this research is a booklet in the form of electronic media in the form of an interactive application that can be accessed via an Android-based smartphone and presented offline. The media was then called an Android-based Interactive E-Booklet. Making Interactive E-booklet uses several software, namely Canva to design the overall layout and typography of content, Flip PDF Professional to make Interactive E-booklet into an interactive flipbook, and Website 2 APK Builder Pro 4.2 to make drafts of Interactive E-booklet into applications (.aps).

b. Format selection

The format chosen is a concept that can cover all learning objectives from the Classification of Materials and Changes chapters. In addition to the content of the material, the media is equipped with the code "Brainstorming", code

"Did You Know?", Activities, quizzes, formative tests, and chapter end tests. The media is also equipped with videos in the form of demonstrations so that students more easily understand the material and are more interested in learning.

c. Initial design

The initial media design includes color selection, content arrangement and content layout, as well as content to be included in the media. Interactive E-booklet are compiled with covers, instructions for use, foreword, table of contents, list of tables, list of pictures, list of videos, concept maps, learning activities 1, learning activities 2, learning activities 3, final e-booklet test, attachments and lists References. Each learning activity contains material content, summaries, and formative tests. Meanwhile, the attachment contains a glossary and answer key.

3. Development Stage (Development)
a. Expert validation

The development stage begins with preparing the software, preparing materials for the contents of the Interactive E-Booklet, implementing the initial design, and designing the application. Interactive E-Booklet compiled using Canva, Flip PDF Corporate, and Website 2 APK Builder Pro 4.2. Flip PDF Corporate is a software that is used to draft an Interactive E-Booklet in PDF format into an interactive flipbook that contains menu features, adds videos, moving images, and interactive quizzes with the final HTML format.

The completed Interactive E-Booklet application is then validated by experts to assess its validity before being used in the next stage. And the following are the characteristics of an Interactive E-Booklet that takes data from the results of the media and material validator assessment, as well as the results of student responses.

1) Self-instructional

Android-based Interactive E-Booklet contains KI, KD, and learning objectives. The media validators agreed to provide a very valid assessment with an average percentage of 100% for the explicit presentation of KI, KD, and learning objectives in the Interactive E-Booklet. The material in it is also divided into 3 subchapters. In addition to the material, in each Learning Activity there are quizzes, summaries, formative tests, and answer keys that allow students to learn independently. There is also a bibliography that provides information on references that support learning materials in Interactive E-booklet. With these things, students can find out the competencies that must be achieved and allow students to learn independently.

2) Self contained

Android-based Interactive E-Booklet contains one unit of competence, namely Basic Competence 3.3 and Basic Competence 4.3. The material validators agreed to provide a very valid assessment with an average percentage of 100% for the suitability of the material with KI and KD chapters on Classification of Materials and Its Changes. In the Interactive E-Booklet the material is packaged in 3 units of learning activities, where learning activity 1 contains material classification of material and mixtures, learning activity 2 contains material for separating mixtures, and learning activity 3 contains material on material properties and material changes. The purpose of packaging the material is to make it easier for students to learn thoroughly.

3) User friendly

Android-based Interactive E-booklet are in the form of android applications that can be stored on mobile phones and can be accessed offline, thus giving students flexibility in their use for learning. The media validator gives a very valid assessment with an average percentage of 83.33% on the flexibility of using Interactive E-Booklet products. The Android base was chosen because the majority of students are smartphone users with the software operating system. In addition to the media device, the language used in the material is also prepared by taking into account the age level of the students and the presentation of the material related to everyday life. The material validator provides a very valid assessment with an average percentage of 83.33% and 100%, respectively, on students' understanding of the message and the standard of the term. Students also showed a very good response with an

average percentage of 83.33% in the presentation of material and practice questions related to everyday life.

4) Can provide critical thinking skills training for students during the learning and evaluation process

Android-based Interactive E-booklet were developed by taking into account aspects of critical thinking skills (critical thinking skills) that were built from the beginning of the material to the final evaluation. Aspects of critical thinking skills in the learning process are shown in the "Braining of Opinions", sub "Activities", and sub "Quiz", where in each sub there are questions that are arranged based on aspects of critical thinking skills. The material validator provides a very valid assessment with an average percentage gain of 91.67% for the "Brashout" sub, "Activity" sub, "Quiz" sub, and evaluation questions contained in the Android-based Interactive E-Booklet can help maximize skills critical thinking of students.

In addition, at the end of the material there is an E-Booklet Final Test which is prepared by taking into account aspects of critical thinking skills. The material validator provides a very valid assessment with an average percentage of 83.33% for the questions on the final test which include aspects of critical thinking skills.

5) Can help maximize students' learning motivation.

Android-based Interactive E-Booklet was developed by taking into account the aspects of ARCS learning motivation (attention, relevance, confidence, and satisfaction) according to Keller (1987). Media expert validators and material experts gave very valid assessments with an average percentage of 91.87% and 100% on the presentation of Interactive E-booklet in an effort to maximize student learning motivation. The results of the student response questionnaire compiled based on the ARCS learning motivation aspects also received a very good response with an average percentage of 86.77%.

The efforts made include compiling an attractive Interactive E-Booklet with a proportional and harmonious layout, as well as being interactive. The media validator provides a very valid assessment with an average

percentage of 91.67%, on the display design. In addition, the Interactive E-Booklet is structured interactively. The interactivity is developed in learning activities which are contained in the form of sub "brainstorming" and sub "activity" as well as in the media itself in the form of a formative test containing five multiple choice questions. The interactiveness of the media received a very valid assessment from the media validator with an average percentage of 91.67%.

The Android-based Interactive E-Booklet was validated by six experts consisting of three media experts and three material experts, both from lecturers and teachers. Media expert validation includes graphic aspects and presentation aspects. Graphical aspects include assessments for presenting KI, KD, and learning objectives in Interactive E-booklet; display design; quality of content (images and videos); the effectiveness of the content in conveying the content or materials; text legibility; as well as the layout of the contents of the Interactive E-Booklet. Meanwhile, the presentation aspect is to assess the flexibility of media use, media interactivity, and media presentation in an effort to maximize students' learning motivation. The following are the results of the analysis of media expert validation in Table 1.

Table 1. Media Expert Validation Results

Validator	Percentage (%)	Criteria
Validator A	97,22	Very worthy
Validator B	83,33	Very worthy
Validator C	94,44	Very worthy
Percentage (%)	91,67	
Criteria	Very worthy	

Based on Table 1, it can be seen that in the media aspect, Android-based Interactive E-booklet are declared very valid with an average percentage gain of 91.67%. Furthermore, in the validation of the material, an assessment of the material contained in the Interactive E-Booklet is carried out, namely the Material Classification and its Changes. The learning aspect is assessed to determine the suitability of the material with the Basic Competencies and the clarity of its

presentation. The following are the results of material expert validation in Table 2.

Table 2. Material Expert Validation Results

Validator	Percentage (%)	Criteria
Validator A	87,5	Very worthy
Validator B	92,5	Very worthy
Validator C	97,5	Very worthy
Percentage (%)	92,5	
Criteria	Very worthy	

Based on Table 2, it can be seen that in the material aspect, Android-based Interactive E-booklet are declared very valid with an average percentage gain of 92,5%.

2. Small scale test

An Android-based Interactive E-Booklet application that has been validated by experts and declared very valid, then tested in a small-scale trial to 30 class VII students of MTs Negeri 2 Kendal. The product trial aims to determine the user's response, namely students and teachers of science subjects. The following are the results of the teacher's response to the Android-based Interactive E-Booklet in Table 3.

Table 3. Results of Teacher Responses to Android-based Interactive E-booklet

User	Percentage (%)	Criteria
One (1) science teacher at MTs N 2 Kendal	92,5	Very good

Based on Table 3, it is known that the teacher's response to the Android-based Interactive E-Booklet is very good with a percentage of 92.5%. Then the student response data was obtained through two small-scale tests with different respondents but still from the same class. Each small-scale test was followed by 15 students. This is due to the limited learning applied at MTs N 2 Kendal during the research. The results of student responses to Android-based Interactive E-Booklet can be seen in Table 4.

Table 4. Results of Student Responses to Android-based Interactive E-booklet

User	Percentage (%)	Criteria
Group A	87,19	Very good
Group B	86,35	Very good
Percentage (%)	86,77	
Criteria	Very good	

Based on Table 4, it can be seen that the response of students to Android-based Interactive E-booklet is very good with an average percentage of 86.77%. This means that Interactive E-booklet can help maximize students' learning motivation.

Android-based Interactive E-Booklet is designed as a learning application that can be accessed via an Android-based smartphone with the following specifications: (1) Android operating system at least Android 5.0 Lollipop version, (2) application size is 68.03 megabytes with a minimum RAM of 250 megabytes, and (3) the application can be accessed offline (without network). Android-based Interactive E-booklet have characteristics obtained based on the results of validity tests (material validation and media validation) and the results of student responses, namely (1) self-instructional, (2) self contained, (3) user friendly, (4) maximizes students' critical thinking skills, and (5) maximizing students' learning motivation.

Self-instructional on Android-based Interactive E-booklet is indicated by the presence of KI, KD, and learning objectives contained therein, so that students can know the competencies that must be achieved. The presentation of Material Classification and its Changes is arranged in 3 Learning Activity units, where each learning activity is equipped with learning activities, summaries, and practice questions for each sub-chapter. At the end of the chapter there are final evaluation questions and answer keys that allow students to learn independently. In addition, there is also a bibliography containing a reference list of learning materials in the Interactive E-Booklet.

The next characteristic is self contained. The Android-based Interactive E-Booklet contains all material from one competency unit, namely Basic Competence 3.3 and Basic Competency 4.3 as learning materials that students will learn in the Interactive E-Booklet. It is intended that students achieve certain competencies (Hamdani, 2011) and to provide opportunities for students to study the material thoroughly. Next is an Android-based Interactive E-Booklet which has user friendly characteristics. Interactive E-Booklet was developed as an

alternative teaching material in the form of an application that can be stored on a cellphone and can be accessed offline (without a network), so that students can access it anytime and anywhere.

In addition, the media is developed according to the circumstances of the students, the majority of whom are Android-based smartphone users, making it easier for students to get and operate the Interactive E-Booklet application. The content of the material is also prepared using language that is easy to understand, simple, consistent in the use of terms, and is contextual in nature, so that the content of the material can be accepted and understood by students better. Modules that pay attention to language according to the level of development of students are good modules (Rosyidah, 2013).

The next characteristic is that Android-based Interactive E-booklet can provide critical thinking skills training for students during the learning and evaluation process. Android-based Interactive E-Booklet was developed by taking into account the aspects of critical thinking skills. Each learning activity begins by displaying the problems that are around which are packaged in the sub "brainstorming". In that section it can be said as brainstorming in learning, where the brainstorming method is a form of discussion that aims to gather ideas, knowledge, and experiences of students (Karim, 2017). As the results of research conducted by Utami (2015) that brainstorming can train and improve students' critical thinking skills in science learning. Next is the "Activity" sub which contains simple experimental activities and their tasks and the "Quiz" sub which contains tasks to test students' understanding after completing a material, where the questions are arranged by taking into account aspects of critical thinking skills. Then there is also a chapter final test containing 10 descriptive questions which are arranged based on aspects of critical thinking skills.

The next characteristic is that Android-based Interactive E-booklet can maximize students' learning motivation. The learning motivation aspect used in this development refers to the ARCS model (attention, relevance, confidence, and satisfaction) according to Keller (1987). Based on the results of the student response questionnaire analysis that contains aspects of ARCS learning motivation, Android-based Interactive E-booklet received a very good response which indicates that Android-based

Interactive E-booklet are possible to help foster students' learning motivation.

In addition, the media is arranged in an attractive manner with a proportional and harmonious layout, and is interactive. This interactivity in learning activities is built through the existence of sub "brainstorming" and sub "activity" which guides students to actively discuss with peers and teachers through identification activities, case studies, and simple experiments, so that learning becomes interactive. While the interactivity of the media appears in the formative test questions. In this test, students can evaluate by answering five multiple-choice questions, which will then appear right or wrong, marked with "Good Job!" for correct answers and "Try again, please!" for wrong answers. The correct answer will also appear after students choose an answer. And the final score will appear after students answer all the questions. This is in accordance with the opinion of Tarigan (2015) that interactive multimedia is a user-media relationship that has a two-way or reciprocal relationship. In addition, the Interactive E-Booklet contains interesting content in the form of images, illustrations, and videos. As an interlude, there is also a sub "Did You Know?" which contains interesting factual information related to the material and its application in real life.

The media expert's assessment includes two aspects, namely the graphic aspect and the presentation aspect. The graphic aspect includes the presentation of KI, KD, and learning objectives in the Interactive E-Booklet; display design; quality of content (images and videos); the effectiveness of the content in conveying the content or materials; text legibility; as well as the layout of the contents of the Interactive E-Booklet. Meanwhile, the presentation aspect includes the flexibility of using Interactive E-Booklet products, Interactive E-Booklet interactiveness, and Interactive E-Booklet presentation in an effort to maximize students' learning motivation. Core Competencies and Basic Competencies are listed at the beginning of the chapter, while learning objectives are listed in each learning activity. Learning media must be in accordance with the learning material and the objectives to be achieved (Amrulloh, 2013). The existence of learning objectives contained in the media will make it easier for students to learn, so that learning objectives can be achieved (Pramana, 2020). In addition to loading text, the material is also

equipped with images and videos of good quality, can be observed in its entirety from the cellphone screen, and can convey the content of the material effectively. The existence of these learning videos can increase students' learning motivation (Novita, 2019). The layout of the contents of the Interactive E-Booklet is also complete, displaying subchapter titles, page numbers, as well as image and video descriptions.

Interactive E-booklet can be used anytime and anywhere, and can be accessed offline, so that students can use them in learning at school and outside of school, and can use the internet network or not use the internet network. The interactiveness of the media is found in the formative test, where the media can provide feedback and two-way responses in the form of false or true statements and the right answer after students choose an answer. After completing all the questions, the total score obtained will also appear. The interactivity of the media is in accordance with Tarigan's (2015) statement which reveals that the interactive multimedia communication component is a relationship between humans (as users) and computers (software/applications/products in certain file formats) which are expected to have a two-way or reciprocal relationship between applications. with users. The existence of a two-way response can help foster self-confidence and student satisfaction (Keller, 1987).

Media experts provide input and advice in terms of media design, namely tidying up the layout which includes display design, content layout, and consistency in the use of font types and sizes, so that messages in learning can be conveyed effectively. An effective media is one that is able to communicate the content of the material to be conveyed (Nugroho et al., 2012). The message can be conveyed properly with the appropriateness and legibility of the text, so that it is easily accepted by the sense of sight (Sudarma, 2015). In addition, the suitability of the colors displayed in the media is also one of the things that can make the media more attractive (Prafitasari, 2020). After making improvements, the media layout received a very valid assessment from the validator.

Next is material validation carried out by three material experts consisting of one integrated science lecturer at the State University of Semarang and two science teachers at MTs Negeri 2 Kendal. Based on the results of the analysis of material expert assessment data, the average percentage is 90.83% so it can be said that in the material aspect, Android-based Interactive E-booklet are very valid. The assessment by a material expert contains three aspects, namely the content component, the language component, and the presentation component.

Aspects of content components include the suitability of the material with core competencies and basic competencies of Material Classification and its Changes, the suitability of the material with learning objectives, as well as learning support materials. Aspects of the linguistic component include students' understanding of the message and standardization of terms. aspects of the presentation component which include the suitability of the final test with aspects of critical thinking skills, presentation of media content in an effort to maximize critical thinking skills, presentation of media content in an effort to maximize learning motivation, coherence of concepts, and completeness of supporting material presentation.

The Interactive E-Booklet contains material Classification of Materials and their Changes which are prepared by taking into account the 2013 curriculum, Core Competencies, Basic Competencies, and learning objectives. In addition, the material is presented contextually by displaying examples that are familiar with everyday life and in accordance with the development of science. Material experts provide suggestions regarding learning objectives listed in the media that need to be adjusted based on the principles of formulating learning objectives that contain elements of ABCD (audience, behavior, condition, and degree). In addition to the aspect of content components, the language component is also very important in the preparation of teaching materials. In the Interactive E-Booklet, the material is presented in a language that is easy to understand, commonly used, does not cause ambiguity, is standard according to KBBI and/or scientific technical terms, and is consistent in the use of terms. The correct use of terms and imperative sentences, the preparation of sentence structures, and the selection of these words can help readers understand the content of the module (Ridha, 2019).

The material in the Interactive E-Booklet is presented by paying attention to the sequence of concepts, namely from easy to difficult, concrete to abstract, and simple to complex. Presentation in this way aims to give students hope and confidence to succeed in understanding the

material (Keller, 1987). In addition, tables, pictures, and videos are presented accompanied by references or sources, identities, as well as proper numbering and naming, making it easier for readers to understand them. Media experts provide input to add identity to the uploaded video along with the list of videos. Then, the material is presented based on aspects of critical thinking skills and learning motivation. It aims to maximize critical thinking skills and learning motivation of students.

The Interactive E-Booklet contains the sub "Braining of Opinions", sub "Activities" and sub "Quiz" which are prepared by taking into account the aspects of critical thinking skills. In addition, the evaluation test at the end of the chapter in the form of 10 descriptive questions was also prepared based on aspects of critical thinking skills. This is an effort built into the Interactive E-Booklet in maximizing critical thinking skills. Next are the efforts made to optimize students' learning motivation by presenting material in an attractive manner, namely by designing interactive media, adding material content with interesting and varied content, compiling contextual material content that is relevant to the lives and needs of participants. educate. The presentation of material concepts is designed from easy to difficult, concrete to abstract, and simple to complex, so as to create confidence in students to understand the material.

The Interactive E-Booklet received a very good response from students and teachers. Student response questionnaires are arranged based on aspects of learning motivation, namely aspects of attention, aspects of relevance, aspects of self-confidence, and aspects of satisfaction. The attention aspect contains two indicators, namely the interest of students and their curiosity about the material in the media. Based on the results of the student response questionnaire analysis, it is known that the Interactive E-Booklet attracts attention, does not contain many words or displays that are distracting and not boring when used in learning. The sub "brainstorming" at the beginning of the material presents a problem that can distract students and make students focused and interested in learning further material. In addition, the Interactive E-Booklet also provides varied material with pictures, illustrations, and videos. By placing pictures or illustrations in several parts such as covers and contents, it can stimulate the attractiveness of teaching materials (Mustafa, 2016).

The relevance aspect contains two indicators, namely the relevance of the benefits of the Interactive E-Booklet to the needs of students and the relevance of the material to everyday life. Based on the results of the student response questionnaire analysis, it is known that the Interactive E-Booklet helps students understand the Material Classification material and its Changes by writing down the learning objectives in the Interactive E-Booklet so that students know the purpose of studying the material. In addition, the content of the material presented is contextual. The contents of the material, both examples and evaluation questions are presented related to everyday life. With the relationship between the material with real life or the experience of students, it can lead students to find meaning, and meaning gives students reasons to learn (Johnson, 2010).

The confidence aspect contains two indicators, namely confidence in learning the material and confidence in understanding the material. Based on the results of the questionnaire analysis of student responses, it is known that Interactive E-booklet are able to raise students' confidence to be able to learn the material with examples, pictures, and videos as well as book pages that do not contain too much information, making it easier for participants to remember points. - important point. Learners tend to be more receptive to material with the presence of image media in learning (Gafar, 2014). In addition, the material is arranged from easy to difficult so that students have the confidence to be able to understand the material (Keller, 1987).

On the aspect of satisfaction (satisfaction) contains one indicator, namely the feeling of satisfaction with the media. Based on the results of the questionnaire analysis of student responses, it is known that Interactive E-booklet provide new experiences and knowledge that are useful for students, make students feel rewarded after completing formative tests, and create a sense of pleasure in learning to use Interactive E-booklet. The presentation of application examples, quizzes, and evaluation questions is arranged from easy to difficult which makes students feel successful from the beginning of learning, so that it can lead to satisfaction and confidence in students in learning. In addition, compose a formative test that can provide a two-way response in the form of the statement "Good Job!" for the correct answer or "Try again, please!" for wrong answers and the acquisition of the final score, so

that students can find out the results of their understanding through the feedback.

The teacher's response questionnaire consists of 10 statements covering aspects of media attractiveness, ease of use, presentation of material, and the benefits of media for users. Based on the results of the analysis, it can be seen that the Android-based Interactive E-Booklet received a very good response from the teacher. Interactive E-booklet can assist teachers in delivering material Classification of Materials and Its Changes, are easy to use, and are able to help maximize students' learning motivation. In addition, the contents of the Interactive E-Booklet which includes materials, activities, quizzes, pictures, videos, and evaluation questions can also help maximize students' critical thinking skills.

CONCLUSION

Android-based Interactive E-booklet have 5 characteristics, namely (1) self-instructional, (2) self-contained, (3) user friendly, (4) can provide critical thinking skills training for students during the learning and evaluation process, and (5) can help maximize students' learning motivation. Android-based Interactive E-booklet are very valid to use, as according to the validation results of media experts and material experts who gave an assessment of 91.67% for the media aspect and 92.5% for the material aspect. The responses of teachers and students to the application were very good, indicated by the results of the questionnaire responses of teachers and students who obtained an average percentage of 92.5% for teacher responses and 86.77% for student responses.

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