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DEVELOPMENT OF ANDROID-BASED INTERACTIVE LEARNING MEDIA ON REDOX REACTION MATERIAL AT SMA NEGERI 18 MEDAN

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ABSTRAK

This study aims to develop Android-based interactive learning media for Redox Reaction material in class X4 at SMA Negeri 18 Medan, based on BSNP standards. To achieve this, the 4D model was utilized, encompassing four steps: define, design, develop, and disseminate. The research instruments included questionnaires and interview sheets, with data processed descriptively. The findings indicate a need for interactive Android-based learning media for teaching redox reactions at SMA Negeri 18 Medan. Consequently, such media was developed, featuring comics, videos, and crosswords, using PPT, iSpring Suite 11, and ApkToBuilder. The interactive media was found to be highly feasible for use in learning, and student responses to the media were rated as "Very Good." Thus, it can be concluded that the Android-based interactive learning media is both valid and practical for use in the learning process.

Keywords: learning media; 4D; android application; redox reaction

INTRODUCTION

Educational science and technology Changes in curriculum and learning tools continue to develop as science and educational technology (IPTEK) progresses. The advancement of sophisticated technology in this day and age is also experiencing rapid development, which includes the world of education. The basic use of technology is to facilitate human work in their daily lives. Digital development in the context of education also has an important impact on the interaction between teachers and students. Chemistry as one of the subjects at school, plays a role in supporting the development of science and technology (Sundayana, 2016).

Based on the results of preliminary observations conducted by interviewing one of the Chemistry teachers at SMA Negeri 18 Medan that in the chemistry learning process still only uses learning media in the form of chemistry textbooks and also Power Point. This causes students to easily feel bored and difficult to understand the material taught by the teacher, so that sometimes students are more often daydreaming, sleepy and so on when the teacher explains the material using the lecture method.

In research conducted by Yektyastuti and khsan (2016), in chemistry subjects it was concluded that using android learning media for students could improve student learning outcomes and student learning motivation. Where in the cognitive learning outcomes of students increased from the average postest of 49.56 to 85.81.

Whereas in research conducted by (Mastur, 2018) The results of the study obtained validation results from material experts, media experts, and chemistry teachers with percentages of 74%, 87.6% and 79% respectively. The results of implementation on students by giving a questionnaire obtained a percentage of 96% with a very good category. Overall, it can be concluded that interactive media is valid for use as learning media in high school.

Based on the problems and some previous research that has been presented, developing learning media is needed to be able to overcome problems in the learning process and can improve student learning outcomes, one form of media development that is comfortable and attractive to students, such as android-based learning media. Based on the explanation above, researchers realize the importance of learning media that is attractive for students to use, especially nowadays students all have an android for school purposes. And in this development, researchers developed media that can be accessed online, so researchers are interested in conducting research in schools that have not used android media as a learning resource.

METHOD

The research conducted in this development project follows the Research & Development (R&D) methodology, specifically utilizing the 4D model which includes the phases of Define, Design, Develop, and Disseminate. This approach aims to create a specific product, evaluate its validity, and determine its effectiveness. The product being developed is an Android-based interactive learning media focused on redox reaction material for students at SMA Negeri 18 Medan. The study involved participants including three lecturers from UNIMED, one chemistry teacher from the school, and 35 students from SMA Negeri 18 Medan.

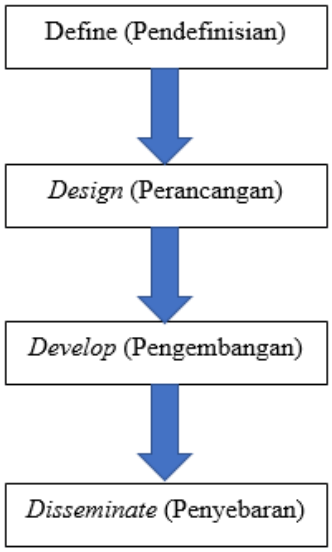

Figure 1 4D Model Flow Chart

This research was conducted from March to June of the 2023/2024 academic year at SMA Negeri 18 Medan. The study's participants were validators, and the research focused on developing application media using iSpring Suite and ApkToBuilder for redox reaction material. The research utilized two types of data: qualitative data from interviews and quantitative data from questionnaires. The instruments employed included validation tools for assessing the feasibility of the Android-based interactive learning media, based on BSNP assessments, as well as student response questionnaires. These instruments aimed to evaluate the practicality of the Android-based interactive learning media for redox reaction material. Both instruments were designed using a Likert scale ranging from 1 to 4, with categories of Very Good (VG), Good (G), Less Good (LG), and Very Less Good (VLG).

The research procedure starts with the defining stage, which involves an initial

analysis to identify the fundamental issues in learning chemistry, specifically redox material. This initial analysis is conducted through observation to determine the conditions, characteristics, and needs of students at SMA Negeri 18 Medan. In the design stage, a draft of the Android-based interactive learning media is created to facilitate the overall development of the interactive learning media, including the preparation of instruments, format selection, and media selection. During the development stage, validation is carried out to assess the appropriateness of the content, language, presentation, and graphics of the material and media. Revisions and improvements are then made based on the validators' suggestions. Finally, a practicality test is conducted by students to evaluate the usability of the interactive learning media. The data obtained from the validation results regarding material feasibility, media feasibility, and practicality were calculated using the following formula:

$$P = \frac{f}{N} x100\ \%$$

Description:
P = Percentage of validity (%)
f = Number of scores from data collection
N = Total maximum score (Jannah & Julianto, 2018)

The percentage of the validity score of the feasibility of android-based interactive learning media and the percentage of practicality can be seen in Table 1 and Table 2.

Table 1. Percentage of media feasibility validity score

Assessment Percentage	Practicality Criteria
76-100 %	Very Feasible
50-75%	Feasible
26-50%	Not Feasible
<26 %	Very unfeasible

Table 2. percentage of practicality

Assessment Percentage	Practicality Criteria
76-100 %	Very Feasible
50-75%	Feasible
26-50%	Not Feasible
<26 %	Very unfeasible

RESULTS AND DISCUSSION

This research produces an android-based application on redox reaction material, where in this application there are Splash screen components, menus, KI and KD, material, comics, videos, crosswords, interactive practice questions, quizzes and profiles. After conducting observations and interviews, several issues were identified. Students showed a lack of motivation to learn and understand redox material, primarily due to reliance on chemistry textbooks and simple PowerPoint presentations, which made the learning process heavily teacher-dependent. According to a needs questionnaire distributed to students, 65.71% found redox material difficult, while 34.28% did not find it challenging. Based on the results of the analysis by going through various considerations, researchers try to find solutions to the learning problems experienced by students, so learning media is needed that can be an alternative and

solution to improve student learning outcomes on the material presented in the Redox Reaction subject at SMA Negeri 18 Medan. It is hoped that the development of this android-based learning media can help students understand the theory and become a source of student learning for Redox Reaction subjects.

This design stage is the initial stage for developing learning media, at this stage researchers are carried out preparing materials and designing or designing learning media to be developed and preparing several aspects used and Gathering information to support the development of Android-based learning media involves preparing necessary instruments. This includes creating validation sheets for expert validators, comprising both material experts and media experts. The validation sheet instrument is prepared to assess the feasibility (valid) of the learning media developed and assessed by experts or expert validators (lecturers). The validation sheet prepared includes: material expert validation sheet and media expert. The material expert validation sheet includes content eligibility criteria according to BSNP, material feasibility, evaluation feasibility, and language feasibility aspects. The media expert validation sheet includes aspects of content feasibility according to BSNP, aspects of language feasibility according to BSNP, and aspects of presentation feasibility according to BSNP, aspects of feasibility of graphics and android-based media according to BSNP.

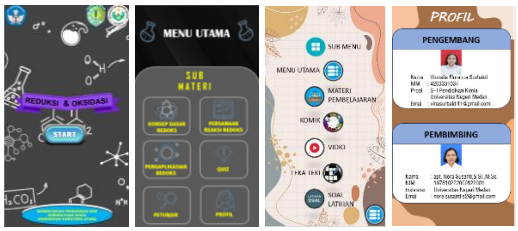

Figure 2 media display

The next stage includes selecting appropriate media that aligns with the characteristics of the material. This process involves analyzing concepts, tasks, target user traits, and deployment strategies, taking into account the various attributes of different media. This helps students achieve the desired core and basic competencies. The third step is selecting the presentation format, which is tailored to the chosen learning media. This involves designing learning content, media within the application, and other learning resources, ensuring the format aligns with student characteristics. The resulting product is media designed to enhance student learning outcomes, specifically an Android-based application with an attractive design.

Expert	Before Revisi	Setelah Revisi
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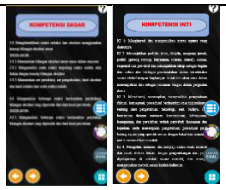
V2	Add KI and KD	
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After completing the Android application-based learning media for Redox Reaction material, the researchers proceed to the development stage, which involves validating the Android application media with the help of material experts and media experts. Material expert validation in this study is 1 lecturer and 1 chemistry teacher who focuses on assessing the feasibility of material, evaluation and language while media expert validation in this study is 2 lecturers who focus on assessing the feasibility of learning application graphics. The assessment questionnaire used in validating this android application is a BSNP assessment instrument. The results of media validation and material validation can be seen in table 3 and table 4.

Table 3. Media Expert Assessment Data Analysis

Aspect	Average Percentage (%)		Average	Practicality Criteria
	D1	D2		
Feasibility of content	95,45%	93,18%	94,31 %	Very Feasible
Feasibility of Language	93,75%	95,83%	94,79 %	Very Feasible
Feasibility of presentation	93,33%	93,33%	93,33 %	Very Feasible
Feasibility of graphic	90%	96,66%	93,33%	Very Feasible
Average (%)	93,13%	94,75%	93,94%	Very Feasible

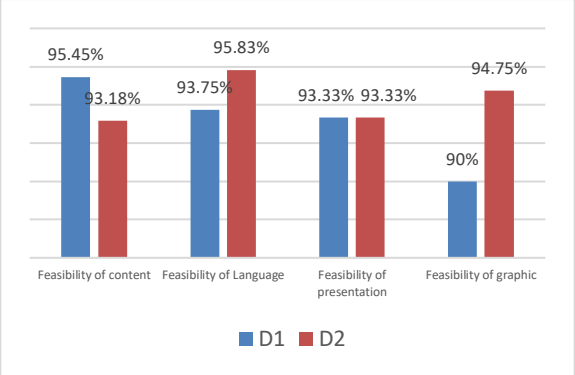


Figure 1. Diagram of assessment by media expert validators

Based on the data above, the following data can be obtained: The number of assessment scores from the first validator in terms of the feasibility aspects of content, language, presentation, graphics and android-based media are 95.45%, 93.75%, 93.33%, and 90% respectively, where the overall average of the first validator is 93.13%. For the second validator, the scores given were 93.18%, 95.83%, 93.33, and 100% respectively, where the overall average of the second validator was 94.75%. From the assessment of the two validators, it was obtained that the average media expert on the aspect of content feasibility was 94.31%, on the aspect of language feasibility of 94.79%, on the aspect of presentation of 93.33%, on the aspect of feasibility of graphics and android-based media was 93.33%. Based on the calculation of the validation of interactive learning media based on android, it can be concluded that the overall percentage of apek from the two validators is 93.94% with the criteria category “Very Feasible”.

Table 4. Material Expert Assessment Data Analysis

Aspect	Average Percentage (%)		% Average	Practicality Criteria
	D1	G1		
Feasibility of content	82,50%	92,50%	87,5 %	Very Feasible
Feasibility of evaluation	75 %	100 %	87,5%	Very Feasible
Feasibility of Language	75 %	100 %	87,5%	Very Feasible
Average (%)	77,5 %	97,5 %	87,5 %	Very Feasible

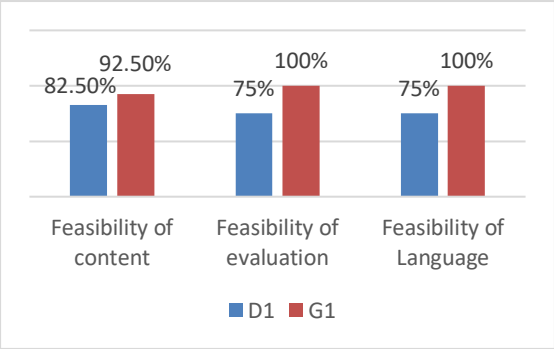


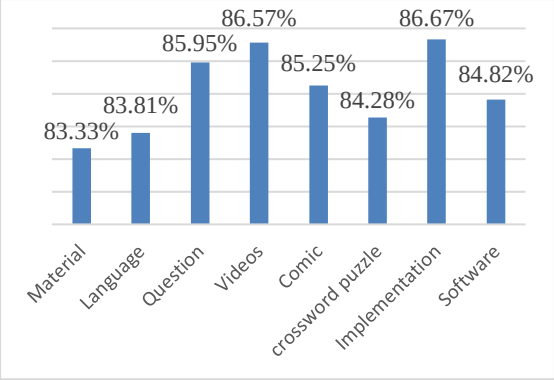
Figure 2. Diagram of assessment by material expert validators

Based on the data above, the following data can be obtained: The total assessment score of the first validator, namely the lecturer in terms of material feasibility is 82.50%, the evaluation feasibility aspect is 75%, the language feasibility aspect is 75%, where the overall average of the first validator is 77.5%. For the second validator, namely the teacher of SMA Negeri 18 Medan, the score given to the redox reaction material from the material aspect is 92.50%, the evaluation aspect is 100%, the language feasibility aspect is 100%, where the overall average of the second validator is 97.5%. From the assessment of the two validators, the average material expert on the evaluation feasibility aspect is 87.5%, on the evaluation feasibility aspect is 87.5%, on the language aspect is 87.5%. Based on the calculation of the validation of interactive learning materials based on android, it can be concluded that the overall percentage of apek from both validators is 87.5% with the criteria category "Very Feasible".

After conducting the feasibility of android-based interactive learning media, students are asked to provide a value for the learning media through the questionnaire provided. Researchers gave a response questionnaire to 35 students in class X4 at SMA Negeri 18 Medan. This stage was carried out by distributing and explaining the learning media developed then asking students to fill out a response questionnaire. The learner response questionnaire contains 34 closed statements which are divided into 8 assessment indicators, namely material, language, questions, videos, comics, crosswords, implementation and software for the media which can be seen in table 5.

Table 5. Learner Response Results

Aspect	Average Percentage (%)	Practicality Criteria
Feasibility of Material	83,33 %	Excellent
Feasibility of Language	83,81%	Excellent
Question	85,95%	Excellent
Videos	86,57%	Excellent
Comic	85,25%	Excellent
crossword puzzle	84,28%	Excellent
Implementation	86,67%	Excellent
Software	84,82%	Excellent
Rata – Rata (%)	85,08%	Excellent



Based on the data, the average assessment of students' responses to each evaluated aspect shows the following results: the material aspect scored 83.33%, the language aspect scored 83.81%, the question aspect scored 85.95%, the video aspect scored 86.57%, the comic aspect scored 85.25%, the crossword aspect scored 84.28%, the implementation aspect scored 86.67%, and the software aspect scored 84.82%. All these aspects fall into the "very Excellent" category. The overall average assessment for all aspects of the interactive learning media is 85.08%, also placing it in the "very Excellent" category. So that this Android-Based Interactive Learning Media is very feasible to use as a chemistry learning media, especially in redox reaction materials.

CONCLUSION

The outcomes of developing Android-based interactive learning media on redox reaction material at SMA Negeri 18 Medan, concerning the validation of the developed application, indicate its validity and suitability as educational media in schools, categorized as "Very Feasible." Similarly, the validation results for the learning material itself are also deemed valid, meeting the criteria for "Very Feasible." Furthermore, student assessments and responses to the Android-based interactive learning media in class X4 at SMA Negeri 18 Medan are deemed "Excellent." Therefore, it can be concluded that this media is highly beneficial to students and suitable for use as a learning aid.

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