

Development of Integrated Smart Apps Creator Media with Guided Inquiry Learning Model on Reaction Rate Material

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Abstract: This research is about developing Smart Apps Creator media integrated with a guided inquiry learning model on reaction rate material. The type of research carried out is Research and Development (R&D). The aim of this research is to develop learning media using Smart Apps Creator which is integrated with a guided inquiry learning model on reaction rate material, as well as getting validation from experts regarding this media and knowing the responses of teachers and students to its use. The development model used in this research is the 4-D model. The stages of 4-D development are the stages of definition, design, development and dissemination. This research produces smart apps Creator learning media that is integrated with the guided inquiry learning model on reaction rate material. The results of the media expert validation assessment obtained an average of 89.6% (very valid). The results of the teacher response assessment obtained an average of 89.5% (very practical) and the results of the student response assessment obtained an average of 82.2% (very practical).

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Introduction

Education in the current digital era requires an innovative approach to support the learning process. One lesson that requires an innovative approach is chemistry. Chemistry is one of the sciences that is considered difficult by high school students. One of the topics in chemistry is reaction rates, which have three levels of representation, namely macroscopic level, submacroscopic level and symbolic level. Reaction rate material is a crucial topic in the chemistry curriculum, but is often difficult for students to understand because it involves abstract concepts and mathematical skills (Priliyanti et al., 2021). It is important for students to understand all the chemical material being tested because most of the material includes concepts, calculations, chemical processes and theory (Farida, 2020).

Based on the results of interviews conducted with chemistry teachers at SMA Negeri 1 Percut Sei Tuan, it was found that the learning outcomes and interest of class XI Matlanfor students in the reaction rate material were still relatively low. This is because students find it very difficult to learn and understand the material. Apart from that, the learning process only uses PowerPoint and printed books from school, causing students to become inactive and feel

bored in the learning process. For these problems, media and learning models are needed that can improve learning outcomes and student interest in the learning process.

Learning media is a tool used to support teachers in conveying knowledge and arousing students' interest in learning, so that the learning process can take place effectively and efficiently. Penggunaan media pembelajaran berbantuan teknologi serta model pembelajaran yang tepat dengan mengikuti perkembangan zaman dapat digunakan oleh siswa dalam melakukan pembelajaran aktif secara mandiri, sehingga memperkaya wawasan dan ilmu pengetahuan siswa yang berdampak pada hasil belajar (Lailatus Sholihah & Nurul Hidayati, 2023). One learning media that can be used is Smart Apps Creator (SAC). SAC is a platform that allows simple application creation without the need for advanced programming skills (Hussein et al., 2022). According to the results of research conducted by Nisha (2022), it was found that students' learning outcomes and interest in learning using SAC media in class XI of SMA Negeri 1 Pasarwajo increased with the average student learning outcomes from 25.4 to 76.6. This is in line with research conducted by Julianto (2022) that student learning outcomes increased with the average N-Gain obtained by 16 students, namely 0.73. Apart from that, research conducted by Fahri (2022) shows that learning carried out using smart apps creator media makes the teaching and learning process easier and students can understand and comprehend learning easily. According to research conducted by Pramesti (2023), the results of media expert testing, expert validation and learning media feasibility tests show that learning using SAC in the Bartening course can increase understanding of knowledge and enable students to learn independently anytime and anywhere. Based on research conducted by Muhaimin and Zumrotun (2023), the use of SAC media in unit of measurement material increases students' interest during learning which is obtained from student response tests with a value of 94.44%. This shows that learning using SAC media has quite a big influence on the learning process.

A teacher must choose the right learning model in the learning process to convey a concept to students. Guided inquiry is a learning model that emphasizes the process of critical thinking and analysis so that students can search for concepts and principles of material with teacher guidance in the form of questions that can direct students to take action (Nurhaedah et al., 2022). According to Fidiana et al (2018), students are encouraged to independently choose the topics they want to study, search for information, and organize or create their own understanding. This process is called concept discovery, which is not presented in a final form. Based on the results of research conducted by Darmawati (2022), the guided inquiry learning model succeeded in improving student learning outcomes. With the inquiry model, students are able to discover for themselves.

The use of SAC and the guided inquiry model can increase student involvement in learning because it provides learning experiences that are interactive, fun, and relevant to everyday life. This can increase students' interest in learning and understanding the concept of reaction rate better. The combination of SAC media and the guided inquiry learning model can be a very suitable approach for teaching reaction rate material in chemistry lessons. Both

support each other to create a learning environment that is interactive, immersive, and facilitates better understanding for students.

The aim of this research is to develop learning media using Smart Apps Creator which is integrated with the guided inquiry learning model for reaction rate material, as well as getting validation from experts regarding this media and knowing the responses of teachers and students regarding its use.

Research Method

The type of research carried out is Research and Development or what is known as Research and Development (R&D), namely research used to produce certain products, and test the effectiveness of these products. This research was conducted at SMA Negeri 1 Percut Sei Tuan from January – June 2024. The subjects in this research were 2 media expert lecturers majoring in Chemistry, FMIPA, Medan State University, a chemistry teacher at SMA Negeri 1 Percut Sei Tuan and 33 students of class XI Matlanfor for small group trials.

The development model used is the Thiangajan model (Sugiono, 2019) stating that "Research and development steps are abbreviated as 4D, which stands for Define, Design, Development and Dissemination". The development model depends on appropriate development steps to the needs that will be implemented by the researcher (Suwardi, 2019).

The needs analysis (define) stage is the initial stage. At this stage, direct observations and interviews were carried out with chemistry teachers to determine potential and problems, so that they could be collected to develop research objectives. At this stage, several aspects are also analyzed, namely (1) the curriculum used, (2) the teaching materials used, and (3) students' interest in learning. Apart from that, researchers also conducted a literature study to collect references regarding the concept of reaction rate which will be used as a basis for creating interactive multimedia learning media for Android-based smart apps creators; the design stage involves preparing a draft, in the form of a media storyboard which will be developed according to the learning model used; development stage, at this stage the development of previously designed products is carried out and validation is carried out against media expert validation; and in the dissemination stage, small group trials are carried out to get a response. The research instruments used were non-test instruments in the form of interview sheets and questionnaires. The questionnaire used is a media expert validation questionnaire which consists of three aspects including linguistic aspects, software engineering and visual appearance. Then, questionnaire responses from teachers and students to see the practicality of the media being developed.

The data obtained was based on media expert validation and teacher and student responses were obtained using descriptive statistics. The measurement scale used is the Likert scale. The Liker scale is made in the form of a checklist.

$$\%Validation = \frac{Total\ Score}{Maximum\ Total\ Score} \times 100\%$$

Table 1. Percentage of Validation Assessments

No	Percentage	Category
1	0 – 40%	Invalid
2	41 – 60%	Less Valid
3	61 – 80%	Valid
4	81 – 100%	Very Valid

(Solikhah & Novita, 2020)

Practicality analysis is used to measure the practicality of the media being developed as a learning medium. The assessment scale used is a teacher and student response questionnaire. This questionnaire contains several questions with alternative answers: very bad (score 1), not good (score 2), good (score 3), and very good (score 4). The data analysis technique used to analyze practicality is the average score obtained.

$$\%Practicality = \frac{\text{Total Scores Obtained}}{\text{Maximum Total Score}} \times 100\%$$

Table 2. Percentage of Practicality Scores

No	Percentage	Katagori
1	0 – 40%	Impractical
2	41 – 60%	Less Practical
3	61 – 80%	Practical
4	81 – 100%	Very Practical

(Solikhah & Novita, 2020)

Result and Discussion

Reaction rate learning material is one of the contents that is often faced by students with a high level of difficulty. This was expressed by (Karlina & Asma, 2022), that many students find it difficult to understand the material on reaction rates, especially the meaning of reaction rates and factors that influence reaction rates. The researcher started the research by conducting a needs analysis, where in this analysis the problem was found that the learning process only used printed books so that students were less interested and thought chemistry was difficult. Student disinterest is triggered by the models and methods used. Therefore, media is needed as a tool. According to (Miokti Yessi, 2021), the use of media in learning is not without reason, apart from making learning easier because it is practical, it can also be accessed anywhere and at any time.

According to (Siregar, 2023), one of the software that can be used to create interactive learning with Android is Smart Apps Creator (SAC). Users can create text, photos and films that search visually using SAC (Julianto, 2022). Apart from that, the SAC application was chosen because this application does not require programming knowledge and can be accessed offline (Pradana et al., 2023).

After finding a solution to the problem that occurs, we enter the design stage. At this stage, the researcher creates a draft, in the form of a media storyboard which will be developed according to the learning model used. This is in accordance with research conducted by Rosmiati (2021) which states that at the design stage, researchers begin to formulate the goals they want to achieve, create learning media storyboards, and create content or subject matter. The media designed is named Speed Chem in apk (Android Package Kit) format. This application also contains questions and learning videos.

The next step is to develop the application (development). This development began by designing the material content according to the guided inquiry model in the Canva application and questions in the Google Form application; prepare various buttons, videos or icons that support the operation of this media; install the SAC application on the laptop/PC; open the installed SAC then select the device type and desired position; organize them page by page and give them a name to make it easier to create media. The use of the guided inquiry model in media creation aims to involve students directly in learning.

This is supported by research by Sholihah and Azizah (2019) that the application of guided inquiry involves students' direct role in expressing concepts and exploring reaction

rate material, thereby making students more independent and responsible. Not only that, research conducted by Darmawati (2022) stated that learning chemistry material using the guided inquiry model improved student learning outcomes. This shows that the model has a positive impact on understanding chemical concepts.



Figure 1. Opening Menu Display



Figure 2. Main Menu Display



Figure 3. Display of Material Content

The content of the media that has been completed provides interaction so that the button can function according to its function. As for how to do it, go to the Insert menu > Hotspot > set the size and position of the icon that will be given interaction > select the Touch feature on the Interaction menu > select the selected object > Switch Page to select destination section > submit. After that, save it and build it into apk form because this application is intended for Android users. The process of converting it into apk form can be done by clicking the smart menu in the top left corner > output. Then a display like the following will appear:

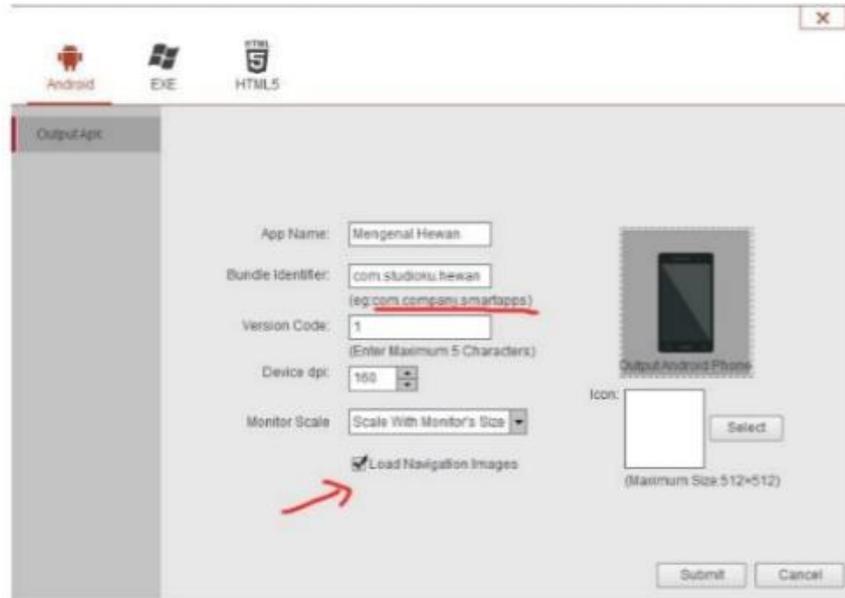


Figure 4. Output Expenditure Settings

The red line must be filled in, no numbers, no spaces and a minimum of three words. For example **com.lajureaksi.smartapss**. Then in the red arrow the check mark is removed or turned off. The icon will be the symbol of the application when installed on Android. The icons used are in PNG format. Finish by clicking submit and wait for the process until it becomes an apk. The resulting reaction rate application was then validated by 2 Chemistry lecturers, FMIPA, Medan State University to measure the level of validity. This measurement uses a media expert validation questionnaire with the aspects assessed, namely linguistic aspects, software engineering aspects and appearance aspects. The validation data obtained is as follows:

Table 3. Media Expert Reserch Results

No	Assessment Aspects	Valuation Percentage		Average
		Validator 1	Validator 2	
1	Linguistic Aspect	81%	94%	87,5
2	Aspects of Software Engineering	89%	96%	92,5%
3	Display Aspects	83%	95%	89%
Overall Average %				89,6%
Result Criteria				Very Valid

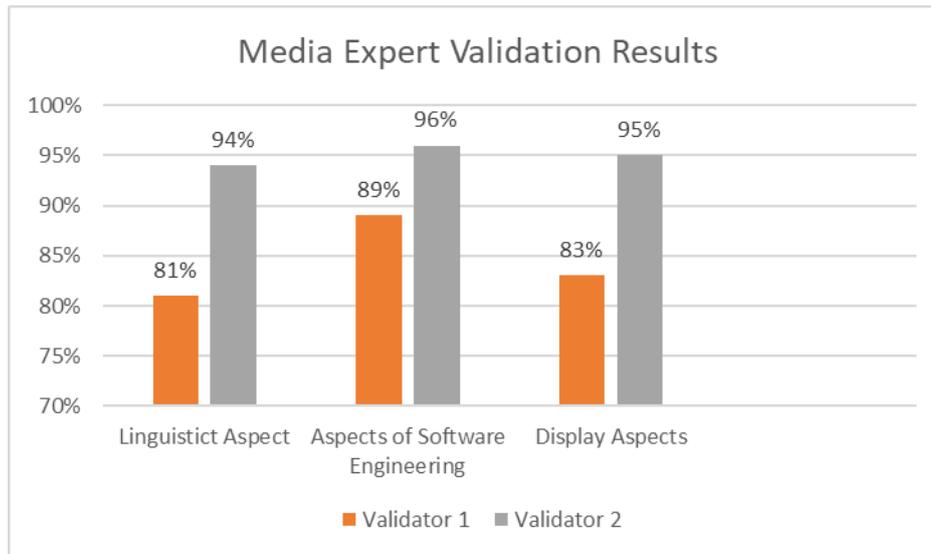


Figure 5. Media Expert Validation Result Diagram

Based on the terserbut diagram, it is known that the value results from validator 1 are marked with an orange colored diagram while the results from validator 2 are marked with a gray colored diagram. Based on terserbut data, validator 1's assessment on the language aspect obtained a score of 81%, the software engineering aspect obtained a score of 89%, and the display aspect obtained a score of 83%. Then, the results of validator 2's assessment on the language aspect obtained a score of 94%, the software engineering aspect obtained a score of 96%, and the display aspect obtained a score of 95%. The average percentage of results obtained from 3 aspects with the results of 2 validators was 89.6%. According to the validation assessment results in (figure 3), the application developed is declared "very valid".

Reaction rate applications that have been declared feasible or valid and after improvements have been made are then distributed. This distribution was carried out in small groups by class XI Matlanfor 1 SMA Negeri 1 Percut Sei Tuan students and teachers to obtain responses. Response data was obtained through distributing designed questionnaires. The student response questionnaire contains 7 aspects, namely material aspects, media aspects, model aspects, display aspects, linguistic aspects, software aspects, and media efficiency aspects. Data from student responses was obtained as follows:

Table 4. Results of Small Group Trials

Information	Aspect						
	Material	Media	Model	Appearance	Language	Software	Media Efficiency
Percentage	83%	78,8%	82%	83,6%	86%	73%	89%
Average	82,2%						
Criteria	Very Practical						



Figure 6. Student Response Result Diagram

Based on Table 4 and Figure 4, it is known that the material aspect obtained a percentage of 83%, the media aspect was 78.8%, the model aspect was 82%, the appearance was 83.6%, the linguistic aspect was 86%, the software aspect was 73% , and the media efficiency aspect was 829%. The average result of student responses was 82.2% with the criteria "feasible/practical". Meanwhile, the teacher's response consists of aspects of appearance and effect for users, aspects of practicality, and aspects of media content. Data obtained from the results of teacher responses are as follows:

Table 5. Educator/Teacher Response Results

No	Assessment Aspect	Average Rating Percentage
1	Appearance and effects for users	91,9%
2	Practicality	90%
3	Media Contents	87,6%
Overall Average		89,5%
Criteria		Very Practicality

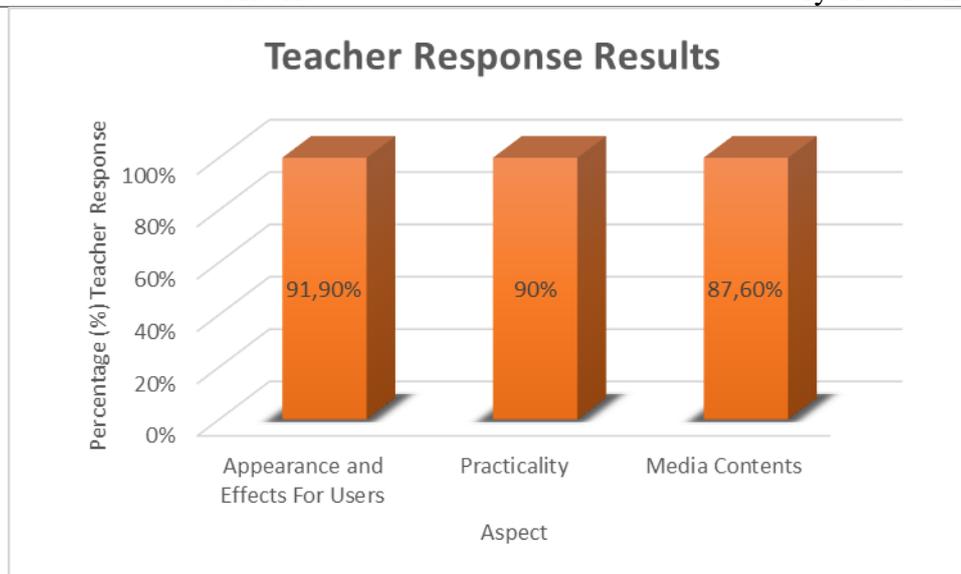


Figure 7. Diagram of Educator/Teacher Response Results

From the results of Table 5 and Figure 5, it is known that the percentage results for the appearance and effect aspects for users were 91.9%, the practicality aspect was 90%, and the media content aspect was 87.6%. The average teacher response result was 89.5% with the criteria "very feasible/practical". Based on this, it can be concluded that reaction rate media based on smart apps creator integrated with discovery learning learning models is very practical and suitable for use as learning media because it can be accessed anytime and anywhere.

Conclusion

Based on the results of media expert validation of the reaction rate application as one of the learning media on reaction rate material by applying the guided inquiry model, it meets the criteria of "very valid or feasible" with the percentage obtained being 89.6%. Therefore, the Android-based media developed is suitable for use to assist the learning process. Then, based on the responses of students and teachers to the reaction rate application developed in terms of several aspects that are assessed, overall it is included in the "feasible/practical" criteria. This can be seen from the average value, where the student response obtained a value of 82.2% and the teacher's response obtained a value of 89.5%. Therefore, it is concluded that the reaction rate application using Smart Apps Creator software is very feasible and practical to use in learning because it can be accessed anytime and anywhere.

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