



# Digitalization Android-based Interactive Learning Media in Geography for High School Students

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## ABSTRAK

Minimnya inovasi media pembelajaran materi geografi menjadi hal yang perlu segera dimutakhirkan. Sejalan dengan itu, tingginya penggunaan smartphone dengan sistem operasi Android berpotensi untuk dijadikan dasar dalam membuat inovasi media pembelajaran. Pembelajaran geografi berperan dalam memberikan pengetahuan, keterampilan dan sikap tentang peduli lingkungan, yang saat ini terlihat sangat sedikit siswa yang memiliki sikap peduli lingkungan, melalui bentuk integrasi antara materi pembelajaran dan teknologi android, dapat terobosan untuk kegiatan belajar. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan inovasi media pembelajaran digital interaktif berbasis android untuk pembelajaran geografi di SMA. Pendekatan penelitian ini adalah penelitian dan pengembangan (RnD) yang mengadopsi model ADDIE, dengan fokus pada pengembangan dan penilaian produk media interaktif berbasis android. Penelitian ini melibatkan satu ahli media, satu ahli materi dan tiga orang guru. Teknik pengumpulan data menggunakan teknik non tes dengan instrumen yaitu angket validasi untuk ahli media, ahli materi dan guru. Hasil kuesioner akan dianalisis secara deskriptif dan menggunakan persentase. Hasil penilaian terhadap produk media interaktif berbasis android memperoleh persentase skor rata-rata ahli media 96% dan tiga guru yang termasuk dalam kategori 'layak tanpa revisi', sedangkan hasil ahli materi dan tiga guru memperoleh skor rata-rata 85,8. % yang termasuk dalam kategori 'layak tanpa revisi', dengan media interaktif berbasis android yang dikembangkan dalam penelitian ini diperoleh keputusan layak untuk diujikan dan digunakan siswa dalam proses pembelajaran.

## ABSTRACT

The lack of innovative learning media for geography material is something that needs to be updated immediately. In line with that, the high usage smartphones with the Android operating system has the potential to be used as a basis for making an innovation of learning media. Learning geography plays a role in providing knowledge, skills and attitudes about caring for the environment, which is currently seen that very few students have an attitude of caring for the environment, through the form of integration between learning materials and Android technology, it can be a breakthrough for learning activities. Therefore, this study aims to develop an Android-based interactive digital learning media innovation for geography learning in high school. This research approach is research and development (RnD) which adopts the ADDIE model, focusing on the development and assessment of android-based interactive media products. This research will involve one media expert, one material expert and three teachers. The data collection technique used a non-test technique with the instrument, namely a validation questionnaire or feasibility test for media experts, material experts and teachers. The results of the questionnaire will be analyzed descriptively and with using percentages. The results showed that android-based interactive media obtained an average percentage score of 96% of media experts and three teachers who were included in the 'decent without revision' category, while the results of material experts and three teachers obtained an average score of 85.8% which was included in the category 'feasible without revision', with android-based interactive media developed in this study obtained the decision that it was feasible to be tested and used for students in the learning process.

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## 1. INTRODUCTION

The damage to this earth can actually be felt, among others; extreme climate change, rising sea levels, rising global temperatures, ecological disturbances, flash floods, pollution of land, air and water. This is a result of climate change caused by the greenhouse effect. Climate change in an area causes the change of seasons to be difficult to know, for example in Indonesia, the dry season is longer and the rainy season will be less, besides that both seasons can reach their extreme peaks. The attitude of caring for the environment itself is included in the 18 values of National Character Education (Astina, 2018). The attitude of caring for the environment is

closely related to learning geography, because learning geography is one of the subjects that is integrated with an attitude of caring for the environment, this can be seen from geographical studies that study the geosphere and the reciprocal relationship between living things and the earth (Artini & Astawa, 2019; Irmawati et al., 2017).

Schools are still very lacking in education about the environment, this is evidenced by the lack of schools participating in the Adiwiyata program, from the number of schools in an area there are still many who have not submitted their schools to participate in the program so that it can be said that school participation in growing an attitude of environmental concern is still lacking (Almas, 2021; Fitriati et al., 2019). The nature of caring for the environment can be demonstrated by respecting nature, while the essence of respecting nature is that every individual has an awareness that humans are part of nature, so loving nature is the same as loving human life (Wardani, 2020; Triani et al., 2019). Environmental care attitudes can be interpreted as efforts to preserve, prevent and improve the natural environment (Fitriati et al., 2019; Cahyaningtyas et al., 2020). The attitude of caring for the environment is understood as the feeling of people who care about environmental sustainability. This attitude cannot be known directly, but is known through the behavior carried out (Cahyaningtyas et al., 2020; Septian, 2017). Schools are considered to be a place that can instill environmental care in students through learning and other environmental activities that can increase students' awareness of caring for the environment repeatedly, therefore all teachers and employees must understand environmental care (Pratama et al., 2020).

At the high school level, it can be integrated with subjects, one of which is Geography. In Geography lessons there are more links between humans and the natural environment, it is hoped that students can understand about protecting and preserving the earth, in accordance with the objectives of learning Geography itself. Geography learning is learning about the spatial aspects that exist on the earth's surface, which are all natural phenomena and human life and regional variations, which are taught in schools with the level of mental development of children at their respective educational levels. Teaching Geography is essentially teaching about the spatial aspects of the earth's surface, which are the overall phenomena of nature and human life with regional variations (Artini & Astawa, 2019; Arliza et al., 2019).

But in reality, Geography learning has not been able to achieve how to instill an attitude of caring for the environment in students. This is caused by the lack of student interest in geography lessons that use simple media such as powerpoint and are still conventional. If the learning is delivered conventionally continuously, students will find it difficult to understand. Because learning Geography requires real examples and illustrations so that students can easily understand the theory but are not accompanied by action, in other words, students are rich in cognitive aspects but lacking in affective and psychomotor aspects. In line with this, the results of observations from three high schools in Surakarta in second grade of social class by distributing questionnaires to students online via Googleform. From the observations it can be concluded that students need flexible and innovative learning media, because the media currently used are still less flexible and less attractive so that students lack new experience in recognizing and using media. In addition, the results of interviews with teachers of Geography subjects in 3 high schools also showed that the use of learning media that was often used was powerpoint.

Along with the times and increasingly sophisticated technology, every school is required to be able to follow these developments so that they are not left behind and are able to compete (Machmud et al., 2021; Rahiem, 2020). One of them is the use of learning media, the use of creative and innovative media will make it easier for students to understand the material and have an interest in learning (Tafonao, 2018; Budiastuti et al., 2018). Learning media can be interpreted as an intermediary or liaison between two parties, namely the source of the message and the recipient of the message, besides that learning media can also be used to convey messages and stimulate the learning process in the learner (Anitah, 2012; Tafonao, 2018). At this time efforts to develop media are very advanced, judging from the learning media used are very diverse in form. The use of innovative media can provide a learning experience for students (Lumbantobing & Haryanto, 2019; Shatri, 2020). Various kinds and types of learning media that have the characteristics of being easy to manufacture in addition to textbooks and powerpoints such as e-books, flipbookmakers, and others, because the presentation is in the form of audiovisual, namely by adding text, images, and videos into a multimedia unit which can then be used on computers, laptops, or smartphones according to the operational system.

Interactive multimedia is a tool that can present messages in an integrated display, from serving text, images, videos, animations, audio, and graphics (Malik & Agarwal, 2012). Multimedia can be presented in digital files, but in line with technological developments, multimedia can now be presented on smartphones and users have full control over the program (Hasyim et al., 2020). Interactive multimedia makes the learning process more fun, more innovative, interactive, can reduce teaching time, can foster motivation and the quality of student learning, can take place anytime and anywhere, and can improve and focus students' attitudes and attention (Sarac, 2017; Komalasari & Rahmat, 2019; Anggraini & Eddy Sartono, 2019; Amelia et al., 2021). In line with that, the application of interactive multimedia in learning in schools is one of the efforts to solve the problem of the lack of innovation and variations in the use of learning media (Sayono et al., 2020; Xu, 2017).

This is because by using the media as a message distributor, it will be able to stimulate the thoughts, feelings, attention and willingness of students so that it can encourage a more interactive and communicative learning process.

Practitioners and researchers who focus on the educational aspect continue to strive to provide innovation to improve the quality of learning processes and outcomes. Many efforts are currently being carried out to improve students' environmental care attitudes, both in terms of policies (Almas, 2021; Astina, 2018), as well as by implementing various approaches or learning strategies and integrating technology into the learning process (Budiarso et al., 2021; Martha et al., 2020; Bhattacharjee & Deb, 2016). There have been several studies on the use of android-based interactive media for learning, both from elementary to upper secondary levels, various previous studies have proven that android-based interactive media contribute to the course of learning activities, competency achievement and ease of accessing learning material resources (Herwinarso et al., 2020; Prasetyo, 2017).

Referring to some research and field facts, it appears that geography learning is still not optimal in providing reinforcement to students' environmental care attitudes, besides geography learning also seems to still focus on achieving competence in the cognitive domain, not affective (environmental care attitude). Field facts also show that the support for geography learning facilities is still very minimal, especially the learning facilities provided by teachers. As when learning activities only use print modules, this shows that the learning media used are still less innovative, and the implementation of the lecture learning method dominates learning activities.

This research will greatly contribute to the novelty of geography learning in the era of digital technology as it is today, where the role of interactive media is optimized to facilitate students during classroom learning activities. There are so many applications of interactive media in schools that have successfully shown a positive impact on increasing student competence. Therefore, innovation through the process of developing Android-based interactive media products will be developed as a digital learning resource for learning Geography at the high school level. This study has differences with some previous studies, where in this study the interactive media developed was based on Android so that it could be used on smartphones, and Geography subjects as the object of information, considering that almost the majority of the use of interactive media in several relevant studies was often used for citizenship subjects, languages, mathematics, and natural sciences. In addition, students who are now accustomed to the presence of Android in their hands will easily access learning materials. Therefore, this study aimed to develop an Android-based interactive media product for geography learning that is suitable for use as a instructional media in learning activities for high school students.

## 2. METHOD

The approach and type of research used is research and development (RnD). With the hope that this type of research can accommodate research objectives to develop an interactive media for learning activities, not only that through research and development it can also be carried out to determine the level of effectiveness of the products developed (Sugiyono, 2018). The ADDIE Model, which is an acronym for Analysis, Design, Development, Implementation, Evaluation, was adopted as a type of research and development, sebagaimana banyak penelitian yang telah mengadopsi model ini untuk proses pengembangan sebuah produk (Febliza & Okatariyani, 2020; Roemintoyo et al., 2022), the selection of this model was based on the relevance and needs of the model with research objectives. However, what is emphasized and focused on in this research is the assessment of the feasibility level of android-based interactive products which are included in the Development stage, at this stage the android-based interactive media will be revised and improved if necessary, referring to comments from several validators. Figure 1 is a research chart using the ADDIE model.

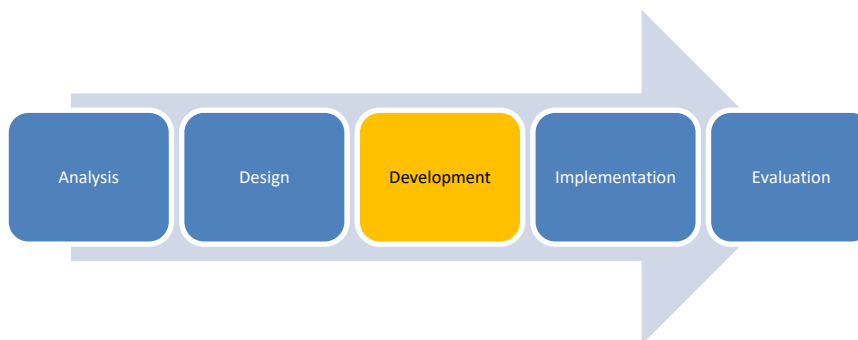


Figure 1. ADDIE Chart

The subjects of this research will consist of validators of media experts, validators of material experts, and teachers (practitioners). The data collection technique used is a non-test technique with the data collection instrument, namely a validation questionnaire for interactive media. The questionnaire used adopted a tiered questionnaire according to Likert 1 – 5, which consisted of Very Poor, Less, Enough, Good, and Very Good statements (Chetty et al., 2019). The validity of the instrument used is validated by means of expert judgment, where each instrument is consulted and validated first by competent experts in their field (Widoyoko, 2018). The items of the instrument used in this study is presented in [Table 1](#) and [Table 2](#).

**Table 1. Media Expert and Teacher Assessment Instruments**

No	Indicator	Question Items
1	Visual Display	1,2,3,4,5
2	Navigation	6,7
3	Usability	8,9
4	Reusable	10
5	Effectiveness and Efficiency	11,12

Adapted from (Perdana et al., 2021; Syawaludin et al., 2019)

**Table 2. Material Expert and Teacher Assessment Instruments**

No	Indicator	Question Items
1	Level of Clarity of Learning Objectives	1,2,3
2	Relevance of Goals with Competence	4
3	Depth of Material	5,6,7,8
4	Contextual and Actual	9,10
5	Completeness of Study Aid Materials	11,12

Adapted from (Fahmi et al., 2021; Syahputra & Maksum, 2020)

The results obtained from the validation process were then analyzed descriptively qualitatively in the form of percentages. [Table 3](#) shows the form of criteria and categories of eligibility for interactive media which were adopted and modified from (Bustanil S et al., 2019; Dinayusadewi & Agustika, 2020), these modifications have been adapted to research needs.

**Table 3. Interactive Media Eligibility Criteria**

No	Percentage	Qualification	Decision
1	81 – 100%	Very good	Eligible without Revision
2	61 – 80%	Good	
3	41 – 61%	Enough	Eligible with Revision
4	21 – 40%	Deficient	Not Eligible
5	<20%	Very less	

Adapted from (Arikunto, 2010; Dinayusadewi & Agustika, 2020)

### 3. RESULT AND DISCUSSION

#### Result

Briefly, in the analysis stage (A) it has been carried out and it is known as in the background that the use of learning media is very minimal and less varied, especially for learning geography. Considering this, then carried out a design (D) related to the type of media and the framework of learning materials, at this design stage, a material framework has been developed that will become the information and content of the developed interactive media. Meanwhile, for the type of learning media, considering the results of the needs analysis, interactive media based on Android is one of the choices according to the needs and characteristics of students. The results of this study focus on assessing the feasibility of the developed interactive media product, which is included in the Development phase (D) of the ADDIE model. The feasibility assessment or validation process will consist of an assessment by media experts, material experts and subject practitioners / teachers.

As the research objective, namely an Android-based interactive media application for learning Geography in high school. In this article, the results of the product development will be presented and reviewed, through a series of feasibility tests, namely feasibility tests by media experts, material experts and teachers / practitioners. Android-based interactive media products that have been developed will be shown in [Figure 2](#), [Figure 3](#), and [Figure 4](#).



Figure 2. Main Menu Display



Figure 3. Material Display

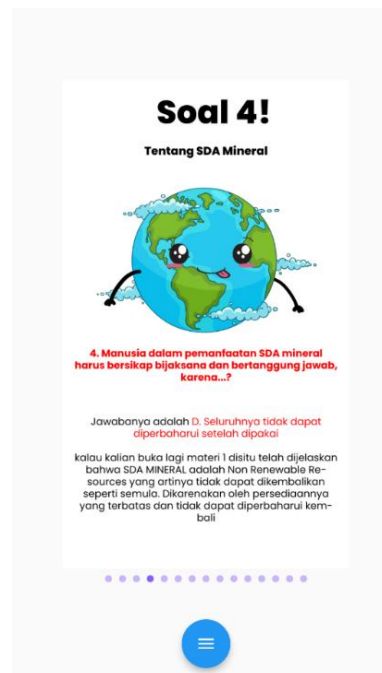


Figure 4. Quiz

After the initial product has been developed, it then enters the development stage (D) which will consist of media assessment by media experts, material experts and by the teacher on each assessment. The first assessment will be carried out by media experts and teachers. The results of an Android-based interactive media product assessment conducted by media experts and teachers is presented in Table 4.

Table 4. Assessment Results by Media Experts and Teachers

Validator	Score	Percentage (%)	Qualification	Decisions
Media Expert	60	100%	Very good	Eligible without Revision
Teacher I	60	100%	Very good	
Teacher II	56	93,3%	Very good	
Teacher III	55	91,6%	Very good	
<b>Average (%)</b>		<b>96%</b>	<b>Very good</b>	<b>Eligible without Revision</b>



Looking at [Table 4](#), it can be seen that android-based interactive media products received a very good rating from the media expert's point of view, as the percentage gain reached 100% including the decision that the media was eligible without revision. In line with these results, the assessments carried out by all teachers with the same instrument items as those of Media Experts, indicate that the products developed are included in the 'eligible without revision' category. Overall the average score obtained for the assessment of Media Experts and Teachers is 96%, which is included in the 'very good' qualification with the inherent decision being 'decent without revision'. Thus, these results indicate that the components that compose android-based interactive media products have met the requirements as learning media. Validation and practicality assessments are then addressed to material experts and teachers of geography subjects. The results of the validation and assessment of the practicality of the media by material experts and teachers are presented in [Table 5](#).

**Table 5.** Assessment Results by Material Experts and Teacshers

Validator	Score	Percentage (%)	Qualification	Decsions
Material Expert	53	88,3%	Very good	Eligible without Revision
Teacher I	46	76,7%	Good	
Teacher II	54	90%	Very good	
Teacher III	53	88,3%	Very good	
<b>Average (%)</b>		<b>85,8%</b>	<b>Very good</b>	<b>Eligible without Revision</b>

It can be seen that in [Table 5](#), the assessment of material experts and teachers on the quality of the material contained in interactive media products is very good. As the percentage of obtaining validation scores from material experts, namely 88.3%, it is included in the decision that the media is eligible without revision. These results are then supported by several gains from each teacher as an evaluator, using the same instrument items as those of the Material Expert. Overall the average score obtained for the assessment of Material Expert and 3 Teachers is 85.6%, this acquisition has been included in the 'very good' qualification with the inherent decision being 'decent without revision'. Thus, the information or material contained in the Android-based interactive media product is relevant to the needs of competence, level of actuality and factuality of the material so that it does not conflict with the structure of student knowledge and the national curriculum.

## Discussion

Through the results of the research that has been carried out, it can be answered that the development of android-based interactive media products is feasible to be tested on students and used for learning geography in high school. The results of the assessment that indicate whether or not an instructional product is appropriate are one of the important parts and conditions that must be passed in a process of developing instructional media, both assessments carried out by learning media experts, material experts, and practitioners or teachers ([Roemintoyo et al., 2022](#); [Anggraini & Eddy Sartono, 2019](#)). The assessment carried out by the validator showed that good results cannot be separated from the various components that make up Android-based interactive media products. Some of these components include, the development of media based on the results of needs analysis, has an element of motivation, is easy to use, has interactive properties and is more than a few constituent elements/not monomedia, displays information that is more attractive and attracts students' attention ([Alfan et al., 2021](#); [Agustini et al., 2020](#); [Kapi Kahbi et al., 2017](#); [Ziden & Abdul Rahman, 2013](#)). So that instructional products in the form of interactive media that are developed will be able to suit the needs of students, which then has implications for increasing students' attention to learning ([Rodhiyah et al., 2021](#); [Zhampeissova et al., 2020](#)).

In the development of android-based interactive media, this can also be one of the instructional media innovations, considering that Android-based devices are currently easy to find and students and teachers have used it very often ([Qodr et al., 2021](#); [Hanif et al., 2018](#)). Besides being based on a series of needs analysis results, interactive media is really needed to support the learning process, especially for learning geography in high school. Empirically, this research is very important for teachers to be able to accept technological developments ([Budistuti et al., 2018](#); [Wahjusaputri et al., 2020](#)), which can be reflected through the process of integrating technology into the learning process ([Moreira et al., 2019](#); [Weng et al., 2018](#); [Zyad, 2016](#)). It is undeniable that currently android users have almost reached all ages so it will be very easy to access, especially for students to add insight and information about a particular subject ([Sinaga et al., 2019](#)), ranging from students to professionals, this opportunity should be a foundation to be able to juxtapose technology and subjects.

As research conducted by [Sulistyo & Kurniawan \(2020\)](#) regarding the development and use of Android-based interactive learning media for history learning, during the development process the media was validated by material and learning media experts, the average evaluation of the five assessment components scored 92%, which means The application of interactive media based on android "JEGER" is very effective and feasible as an

innovative and creative media and model of history learning. In line with that, it appears that the benefits of applying media with digital formats are also considered to be able to influence the acquisition of student learning outcomes, both in terms of affective, psychomotor and cognitive (Junaidi, 2019; Motamedi, 2019). The attitude of caring for the environment is included in the learning achievement in the affective aspect. Several studies have shown that the use of android-based interactive media will affect student attitudes (Elmunyah et al., 2019; Sayono et al., 2020). In addition, as a form of learning innovation in the digital era for geography learning, Android-based interactive media can also be integrated with learning models and approaches such as the determination of Android-based interactive media with guided inquiry learning models of Android-based interactive media that were developed integrated with local wisdom. expected to be able to improve student character, and interactive media can also be integrated with contextual learning forms (Arliza et al., 2019; Dewi et al., 2019; Sayono et al., 2020).

Overall, instructional products in the form of Android-based interactive media are one of the innovations that suit the needs of the field, where some of the main advantages and benefits that students will get when using this product are the facilitation of the independent learning process, the format of presenting the material that is attractive and interesting, friendly. users and adaptive to the development of information technology (Alfan et al., 2021; Syahputra & Maksum, 2020; Arliza et al., 2019). In addition, this research has also succeeded in identifying the various benefits of implementing Android-based interactive media in learning, as well as the inherent benefits when teachers use digital media such as focusing students' attention, increasing overall interaction, and being able to become student facilities for the independent learning process (Saputri et al., 2018; Hasyim et al., 2020).

The results of the research in the form of an Android-based interactive media product were declared feasible by media experts, material experts and teachers and could be an innovation to be applied to the learning process, especially for geography subjects in order to shape students' environmental care attitudes. However, this research is still limited to assessing the feasibility of android-based interactive media for geography learning, not to user trials and testing the effectiveness of media products. Therefore, further trials are still needed, both to determine the level of practicality of use by students, as well as to find out the level of effectiveness of this Android-based interactive media product on increasing students' environmental care attitudes, as one of the learning outcomes included in the affective aspect.

#### 4. CONCLUSION

Android-based interactive media products have the potential to be utilized to facilitate learning activities, through the creation of a dynamic learning environment that is integrated with information and communication technology. The results of the assessment which show that android-based interactive media products are suitable for use during the learning process, indicate that it is important for educational institutions and educators to be open and accept the presence of technology to be integrated into learning activities. It is recommended for teachers to use digital and interactive media products to make it easier for students to learn. This research can be used as a basis by other researchers to be able to develop android-based interactive media for other topics and subjects so that it can facilitate and facilitate students in learning, both collaborative learning activities and independent learning.

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