



# Development of Android-Based Learning Media

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**Abstract:** This study aims to develop a learning media. This research was a type of development research by adapting the ADDIE development model (Analysis, Design, Development, Implementation). The object of this research was students in class IPA SMAN 1 Suwawa with a total of 117 students. The entire content of the material, media, and language in the learning media had to undergo an expert validation process to create draft II. Draft II then underwent product revisions in a limited trial and created draft III. Then, in a field trial with a total of 117 students, the response received a "very strong" percentage with a percentage of 94.50%, creating the final product improvement for researchers. The results of the research were creating learning media in the form of Android-based applications in employment subjects with details on the homepage feature, Basic Competency & Learning Objectives feature, learning material feature, Practice Questions feature, and About feature.

**Keywords:** Androids; Employment; Learning media

## Introduction

Learning from the bench in schools is needed in the realm of national education, this is because children can understand learning concepts from an early age and can apply them in everyday life (Cárdenas-Quispe et al., 2021; Sierra, 2020). The principles of learning itself have basically been taught since we were in elementary school (Agnesian et al., 2023; Erni et al., 2021; Liu et al., 2020; Wen & Yu, 2017).

The process teaching teachers are required to be able to utilize various learning media optimally, so that it will affect the learning process and the goals to be achieved, but not all teachers can use learning media during the learning process, this is also due to the limited learning media provided by schools (Fitriandari & Winata, 2021; Khasanah & Rusman, 2021; Musa et al., 2023; Sholihah, 2016). As a class manager, the teacher should be able to manage the class as a learning environment and develop learning media according to the needs of students in the class (Puspitarini & Hanif, 2019).

In addition, the teacher is also a facilitator and intermediary of knowledge for students, should be able to seek diverse and useful learning resources, and can support student learning in accordance with technological developments that continue to develop. It is intended that the teaching and learning process can still support the achievement of goals and the teaching and learning process by continuing to keep abreast of the times (Sukmawati et al., 2022; Winden et al., 2019).

On the other hand, students are expected to be able to understand both theoretically and practically in order to support their role in everyday life. It is not surprising that in the learning process, there will be many challenges related to students' understanding of learning subjects. In studying, it is not uncommon for students to have many problems and obstacles during the learning process. Some of them, as stated by Surahman, dkk (2020) learning difficulties are factored in by teachers not having good communicative skills with students, the relationship between teachers and students is not harmonious, and the teacher's teaching

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methods are not liked by students (Surahman et al., 2020).

Learning difficulties are also influenced by curriculum factors where the learning materials are too difficult for students to understand, the distribution of material each semester is not balanced, the factor of learning media educational facilities are still lacking, and teaching aids are not yet available (Bens et al., 2021; Churiyah et al., 2020; Palestina et al., 2020; Su, 2012). Learning difficulties are also caused by the disciplinary factors of these students. So that it can be said that the learning difficulties of these students should be a reference for teachers in understanding students not only in an effort to motivate students intrinsically but also by providing extrinsic motivation through consideration of making learning media as creative as possible in order to increase interest in learning students which will lead to student learning outcomes (Ellyzabeth Sukmawati et al., 2022; Lim & Richardson, 2021; Simamora, 2020; Vo et al., 2020).

Educational media used in the framework of communication and interaction between educators and students in the learning process can be said to be learning media (Sumarmi et al., 2021). Learning media are specifically used in the learning process to achieve certain goals or competencies that are formulated. Learning media is a means to help channel information, in order to achieve learning goals. Usually made and determined by the teacher or other teaching staff so that it can make it easier to convey material and can be used by students in the teaching and learning process (Martzoukou et al., 2020).

Learning media is a learning component that has an important role in teaching and learning activities, so the use of media should receive the attention of the teacher in every learning activity (Andriyani & Suniasih, 2021). In reality on the ground, instructional media are still often forgotten and not used for many reasons. As well as the difficulty in making or determining the right media, another reason is that it takes time to manufacture as well as a matter of cost. Basically, this doesn't need to happen because every teacher is certainly equipped with more knowledge and skills about learning media (Knox, 2020).

Like the initial observations that researchers made at SMA Negeri 1 Suwawa, a leading high school in Suwawa District, learning was carried out at school using printed media and notebooks as learning resources and using PowerPoint as a learning medium. It is known that students will be less enthusiastic about responding when using ppowerpointmedia only and especially when not using media in the learning process. However, when using smartphone media students tend to be enthusiastic. For example, when studying using video media, practice questions, and it was found that

the enthusiasm of students in responding and asking questions was greater.

Students' interest in smartphones is a significant impact of technological developments on human life patterns, a simple example is the use of smartphones in everyday life which has been able to bring about change and addiction in human behavior itself. As an example of the case, based on the results of observations by researchers at SMA Negeri 1 Suwawa, students at SMA Negeri 1 Suwawa seem very addicted to using smartphones during the learning process in class. This activity is of course very disturbing to the learning process where the concentration of students will be reduced and students will be more focused on looking at smartphones during the learning process rather than listening to the teacher's explanation in front of the class.

Judging from the other side, along with current technological developments, the world of education on the other hand must continue to grow and carry out various reforms in order to improve the quality and quantity of education. To improve the quality of education various breakthroughs are needed, some of which are curriculum development as has been going on for the last few decades, learning innovations, and the provision of educational facilities and infrastructure that can certainly support learning activities. To continue to improve student learning achievement and attract student interest in learning, teachers are required to make learning more innovative and interesting which is able to encourage students to be able to learn optimally both independently and in class learning (Bandi & Sherpa, 2023; Said et al., 2018; Vanjire & Lakshmi, 2022)

Through the scientific concerns that have been written, the authors show that there is relevant research. The first study compiled by Irsanti (2017). The similarities in previous research and this research are that both use development research. Furthermore, the difference that the researchers found was in the type of development where previous research focused on learning videos while this research will not only contain learning videos but also contain learning objectives and quizzes as evaluation questions of students' mastery of the material (Irsanti, 2017).

The results of the analysis show that the effectiveness of learning in the experimental class using scrabble learning media is significantly more effective than learning in the control class using conventional learning media. The research similarities that researchers found were both using development research and high school objects in learning. However, the difference lies in the learning media that was given development in previous research, namely Scrabble, while in this study it was Android-based learning media (Muzaffar et al., 2022).

The third study entitled "Development of iSpring-Assisted Mobile Learning-Based Learning Media to Improve Learning Outcomes of Surakarta 8 Public High School Students, by Sholihah (2016). This study aims to test the effectiveness of iSpring-assisted mobile learning-based learning media to improve learning outcomes students at SMAN 8 Surakarta in 2016. The method used is classroom action research and development research. The conclusion from this study is that iSpring-assisted mobile learning-based learning media is feasible and effective to use to improve student learning outcomes. This is based on the results of the t test which shows a significance value ( $0.001 < 0.05$ ) identifying that there are differences in the learning outcomes of the experimental class and the control class. The research similarities are in the development research methods used and in learning subjects, but the differences are in previous research finding out the effectiveness of media use using a combination of classroom action research but in this study researchers will focus more on the development of learning media and focus on one class. Of course, then the previous research developed mobile learning with the help of iSpring while this research was the development of Android-based learning media (Sholihah, 2016).

Based on the studies that were previously published, this paper certainly has differences. Previously, this paper was to continue previous research that discussed the same matter. The thing that makes a prominent difference in this study is the existence of an object that is used as a research subject, namely class XI SMA Purnama Trimurjo. In addition, this study uses the ADDIE mode in its implementation. Another thing that needs to be considered in distinguishing this study from previous studies is the total number of 117 people compared to previous studies.

So, based on the problems found and the considerations above, the researcher is interested in developing an Android-based learning media for students of SMA Negeri 1 Suwawa. The learning media available at the current learning location are picture media and power points and textbooks as a source of learning subject matter. In this title proposal, researchers are interested in using the Research and Development type of research where the development method used in this study is the model developed namely the ADDIE model (Analysis-Design-Development-Implementation- Evaluation). This model will be adapted to the finished product stage without carrying out the final evaluation process. Based on the above considerations, the researcher proposed a research title "Development of Android-Based Learning Media in learning Subjects Class XI at SMA Negeri 1 Suwawa".

## Method

This research will use the type of Research and Development or Research and Development (RnD) (Sugiyono, 2017). Methods of research and development of research methods are used for teaching media in learning lessons and to find out the effectiveness of the products produced (Sugiyono, 2018). This Research and Development (RnD) research has a research model adapted from ADDIE which consists of five stages of Analysis, Design, Development, and Implementation. This stage is also carried out systematically. The number tested in the field was 117 people and the number tested on a limited basis was 28 people with random sampling carried out at the development stage. Data collection techniques using validation sheets to get opinions and assessments from the validator on Android media in learning will be compiled. The contents of the validation sheet itself are in the form of draft 1) the results of the validator's assessment will then be taken into consideration by the researcher in revising draft 1 and continuing in drafting 2. The validation sheet will then be given to the validator and the validator will write suggestions and comments regarding the features displayed in the application. The assessment will include language, format, materials, illustrations, and content as agreed by the validator as good and quality media. The use of questionnaires in collecting information from students regarding students' responses to learning activities with Android-based media. Students will then write a sign ( $\surd$ ) if they agree in each available column for each question asked about the features, content, language, and material in the application. This questionnaire will be given to students at the end of learning activities using Android media. Data analysis was carried out on material sheets which were validated by the validators and were then described by the authors. while the respondent data from students is calculated and presented through the following assessment categories.

## Result and Discussion

This research is a research on the development of learning media in the form of Android-based applications on employment material. This research was carried out in the development process to obtain new and interesting learning media products for students at SMAN 1 Suwawa. The class XI students were taken as samples in this study with a total of 117 students. The series of research results that the researchers carried out were validation activities for material experts, linguists, and media experts, phase I product revisions, limited trials to 1 class, phase II product revisions, field trials in

one grade XI class of SMAN 1 Suwawa, product revisions stage 3 and the last process is the final product refinement.

*First*, analysis is the initial stage of a series of development research processes. The main activity that researchers carry out at this stage is to analyze the needs of development research. Based on the performance identification carried out by researchers during the implementation of learning lessons on employment material, the researchers found that the problem faced was that the learning media were monotonous with the use of power point and there was no development. This Android-based learning media can help make it easier for teachers to carry out learning more effectively. The majority of students are Android smartphone users so that the goals of the development are in accordance with the products being developed. Analysis of the research students found that students had less interest in participating in the learning process. After the researcher made an approach in the form of pre-observation on students, it was found that students were less interested in the learning media which were considered boring and a lot of description material that was difficult to understand. The researcher also found based on knowledge and skills that students did not understand the material presented in class, and an analysis of students using video media found that students were able to think critically and creatively with the new learning media. In material analysis, the researcher does not forget to carry out a task analysis where there must be a match between the tasks given and the learning objectives to be achieved in the employment material. So that researchers will then compile practice questions in this android-based application in accordance with the objectives of explaining the meaning of employment, employment opportunities, and the work force, explaining how to improve the quality of the workforce, explaining the wage and payroll system that applies in Indonesia, explaining the causes of unemployment, and explaining the negative impact of unemployment and how to overcome the problem of unemployment in Indonesia. *Second*, at this design stage the researcher begins to collect all the results of the analysis that was carried out in the early stages. It was found that employment material will become material in the developed media. Researchers have designed the application by paying attention to the learning objectives on employment material. The draft then becomes the initial design of the application. In this initial design, the researcher divided the application features into 3 features, namely objective features, material, and practice questions. In the initial display, when students as application users, both teachers and students open the application, they will be presented with a menu of learning objectives.

Furthermore, if students touch the material menu. This material menu will contain employment learning materials that are in accordance with the learning objectives mentioned earlier, namely first the definition of employment, employment opportunities, and the workforce, the second is how to improve the quality of the workforce, the third is the wage and salary system that applies in Indonesia, the four causes of unemployment and finally the negative impact of unemployment and how to overcome the problem of unemployment in Indonesia. Furthermore, on the question menu, practice questions are designed by researchers as developers to evaluate student learning outcomes. The results of this evaluation can be carried out independently by students outside the school environment such as at home. This feature will make it easier for students to measure their mastery of the material they have. Here students can choose which questions they want to follow. Each question will contain 10 question numbers.



Figure 1. Learning Objectives Features (draft 1)

Third, development is an advanced stage of the analysis and design stage. At this stage the researcher will start validating learning materials, validating learning media, and validating language. The series of development will contain the following stages. The results of expert validation will be in the form of comments and suggestions that researchers can use as a basis for revising and improving the media being developed. The results of the revision that has been implemented will be referred to as draft II. Validation is carried out by expert validation, the validator will assume full responsibility for the process of creating good learning media. The validator responsible for developing android-based learning media on employment material is the media expert validator Ridwan Djabar, S.Pd., M.Pd as the learning media developer and material expert validator Toni Ahmad, S.Pd, as the learning subject teacher at SMAN 1 Kabila and Mrs. Dr. Radia Hafid, S.Pd., M.Sc as a lecturer in learning at the UNG Postgraduate Program and

validator for mother as an Indonesian language teacher at SMAN 1 Suwawa.

**Table 1.** Learning Material Expert Questionnaire

Observed aspect	Observation Value				
	1	2	3	4	5
The use of learning applications that are used in accordance with basic competencies					√
The learning application used is in accordance with the learning objectives of employment material					√
The learning application used is free from concept errors				√	
The learning learning application used is in accordance with employment material					√
The learning application used has the scope and adequacy of the material				√	
The suitability of the material delivery strategy in the application with the characteristics and abilities of students.				√	
The accuracy of the material delivery strategy so as to enable ease of understanding and mastery of material, concepts or skills.				√	
The level of possibility encourages the willingness of students to think critically and solve problems.					√
The learning application used contains practice questions that are in accordance with employment material					√
Appropriateness of the level of difficulty of evaluation questions with the abilities and levels of students.					√

**Table 2.** Questionnaire of Learning Material Experts (Learning Subject Teachers)

Observed aspect	Observation Value				
	1	2	3	4	5
The use of learning applications that are used in accordance with basic competencies					√
The learning application used is in accordance with the learning objectives of employment material					√
The learning application used is free from concept errors				√	
The learning learning application used is in accordance with employment material					√
The learning application used has the scope and adequacy of the material			√		
The suitability of the material delivery strategy in the application with the characteristics and abilities of students.				√	
The accuracy of the material delivery strategy so as to enable ease of understanding and mastery of material, concepts or skills.				√	
The level of possibility encourages the willingness of students to think critically and solve problems.					√
The learning application used contains practice questions that are in accordance with employment material					√
Appropriateness of the level of difficulty of evaluation questions with the abilities and levels of students.					√

The results of the questionnaire above come from the product design phase I or also called *draft I*. So, there are still some improvements that need to be made by

researchers. The results of revisions from material experts can be seen at Table 3.

**Table 3.** Material Expert Revision Results

Material Expert Subject Name	Criticism and suggestions
Dr. Radia Hafid, S.Pd., M.Sc	- The instrument is suitable for use provided that the material is updated and not focused on just one source
Toni Ahmad, S.Pd	- The content of the material is in accordance with the basic competencies and learning objectives - Improve the rules of writing good and correct questions - Compatibility of KD and question candy - The answer options do not refer to one answer to the question.

The media expert validator will provide an assessment of the suitability of the features contained in the application, the suitability of navigation and interactivity, typography, colors, illustrations, icons, layout, suitability of the application with the content of the material, objectives and the quiz that the researcher

presents. As for draft I, in the form of an initial draft of an Android-based learning media on employment material, it has been submitted to media experts and received a phase I product revision as in the following questionnaire as Table 4.

**Table 4.** Phase I product revision

Observed aspect	Observation Value				
	1	2	3	4	5
<i>Android</i> - based learning media is easy to operate.				√	
Appropriateness and quality of the use of graphics and visuals (features and images) with the purpose, content and characteristics of the audience (students) concerned.			√		
Appropriateness and quality of utilization of the contents of the application material in accordance with the objectives, the content of the material and the characteristics of the audience (students) concerned			√		
The suitability and quality of using learning videos is in accordance with the objectives, content of the material and the characteristics of the audience (students) concerned			√		
Appropriateness and quality of the use of material content and quizzes in accordance with the purpose, content of the material and the characteristics of the audience (students) concerned				√	
The accuracy of the use of communication language in accordance with the purpose, content of the material and the characteristics of the audience (students) concerned				√	
Interactivity level and then navigation			√		
The button layout and text are easy to understand				√	
Overall attractiveness of the media packaging (typology, colors, illustrations, icons, layout, etc.)				√	

The media expert validator provides several revisions related to the adequacy of the media where the indicators that score quite low are the suitability and quality of the use of graphics and visuals (features and images) with the objectives, the content of the material and the characteristics of the audience (students) concerned, the suitability and quality of the use of the content application material in accordance with the

objectives, the content of the material and the characteristics of the audience (students) concerned, the suitability and quality of the use of video learning in accordance with the objectives, the content of the material and the characteristics of the audience (students) concerned and the level of interactivity and then navigation.

**Table 4.** Media Expert Revision Results

Media Expert Subject Name	Criticism and suggestions
Ridwan Djabar, S.Pd., M.Pd.	- Equipped with storyboard media - The media should start with the logo and the main menu - The interface display on the material menu has been readjusted mainly on the material menu. -Do not use capital letters throughout the material -Added a reference menu, developer information and instructions for using media

It is necessary to pay attention to the grammar used in the learning media. This is intended so that students do not experience difficulties in understanding the material to be conveyed in the teaching and learning process. The linguist validation was carried out in order

to achieve this goal. The language validator in this study was Mrs. Lastin Suma, S.Pd., M.Pd. as the Indonesian language teacher at SMAN 1 Suwawa with the assessment in the questionnaire as follows as Table 6.

**Table 5.** Language Expert Questionnaire Vallidation Results

Observed aspect	Observation Value				
	1	2	3	4	5
The accuracy of the sentence structure to represent the message and information to be conveyed					√
The effectiveness of the sentences used				√	
The standard of terms used is in accordance with the function				√	
Communicative and facilitate students' understanding of material or information				√	
The language used is able to motivate students					√
The language used is able to encourage students to think critically					√
The suitability of language with the intellectual development of students					√
Appropriateness and accuracy of writing and punctuation used			√		
Appropriateness and accuracy of the grammar used				√	
Spelling accuracy used				√	
The use of terms that are precise and not arbitrary					√
The use of appropriate and unchanging symbols or icons					√

Based on the questionnaire data above, the researchers found that almost all indicators were in good numbers. However, there is one indicator that is included in the

sufficient assessment, namely the suitability and accuracy of the writing and punctuation used.

**Table 6.** Linguist Revision Results

Media Expert Subject Name	Criticism and suggestions
Lastin Suma, S.Pd., M.Pd	- Writing the contents of the material using a capital letter sentence format only at the beginning of each sentence. - Fix typos

The research was continued with a limited trial by giving a draft to 28 students in 1 class. The class taken is

at level XI at SMAN 1 Suwawa. The following are the results of the limited trial.

**Table 8.** Result of Limited Trial

	Responded Aspect		Student Response
	Easy	Not easy	
What do you think about employment matters?	28	0	Not easy
What do you think about learning applications?	Interesting	27	Not attractive
	New	25	1
What do you think about the learning component: • Learning application • Presentation of material • Classroom learning atmosphere	Interested	25	Not interested
	Clear	25	Unclear
Are you interested in taking learning lessons using employment learning applications like this?	Interested	28	Not interested
Can you clearly understand the language used in this employment application?	Easy to understand	27	Difficult to understand
What do you think about the appearance (writing, illustrated features and image placement) in the employment learning application?	Easy to understand	27	Difficult to understand
What do you think about learning material if it is presented in an <i>Android</i> - based application?	Easy to understand	27	Difficult to understand

The details of the revision that the researcher got from the responses of the students in the limited trial were as Tabel 9.

**Table 7.** Limited Trial Revision Results

The details of the revision that the researcher got from the responses of the students in the limited trial were as follows: The details of the revision that the researcher got from the responses of the students in the limited trial were as follows:	The details of the revision that the researcher got from the responses of the students in the limited trial were as follows: The details of the revision that the researcher got from the responses of the students in the limited trial were as follows:
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**Table 8.** Product Revision Phase II (Draft III)

Before Revision	After Revision
<i>The lock screen</i> has not been implemented	<i>The lock screen</i> has been applied

The field trial was the provision of draft III to then be tested on learning subjects in all XI graders at SMAN 1 Suwawa.

**Table 9.** Student Response Questionnaire Results (Field Trial)

	Responded Aspect		Student Response
	Easy	Not easy	
What do you think about employment matters?	110	7	
What do you think about learning applications?	Interesting	Not attractive	
	112	5	
What do you think about the learning component: • Learning application • Presentation of material • Classroom learning atmosphere	New	Not new	
	111	6	
Are you interested in taking learning lessons using employment learning applications like this?	Interested	Not interested	
	111	6	
Can you clearly understand the language used in this employment application?	Clear	Unclear	
	109	8	
What do you think about the appearance (writing, illustrated features and image placement) in the employment learning application?	Interested	Not interested	
	112	5	
What do you think about learning material if it is presented in an <i>Android - based application</i> ?	Easy to understand	Difficult to understand	
	109	8	

The entire series of revisions that have been carried out by researchers in this process will become phase III product revisions. The phase III product revision that the researcher has completed has then become a finished product and is ready to undergo the process of perfecting the final product.

Completion of the final product of developing learning media in the form of an android-based application on employment material. This improvement is the final result of a series of learning media designs (draft I, material validation test, media validation, language validation, product revision phase I (draft II), limited trial (28 students), product revision phase II (draft III) ), field trials (117 students) to revision of the final product. So that at the stage of perfecting this final product it will contain all improvements based on validator and student considerations. In the opening display students will be presented with the UNG logo as the campus where the researcher carries out education. This aims to provide an identity for each research activity carried out. After students open the application and the Gorontalo State University logo appears, students will be presented with a welcome menu. This menu can make students remember the material that will be discussed in the application. The welcome menu will also attach the name of the researcher as the developer and the target students for this application. The next display is the main menu display. When students touch "start learning" then students will

automatically be delivered to the features provided by researchers in this learning media. These features are in the form of a homepage, learning objectives, learning materials, practice questions, and information about the application. Basic competency features and learning objectives will display basic competencies and learning objectives in employment material. In terms of learning material features, researchers have adjusted the material in the learning media to be aligned with the learning objectives to be achieved. So that the learning material contains the notion of employment, employment opportunities, and the workforce, how to improve the quality of the workforce, the wage and salary system that applies in Indonesia, the causes of unemployment and the negative effects of unemployment and how to overcome the problem of unemployment in Indonesia. The evaluation question feature was created to serve as a benchmark for researchers and teaching staff at SMAN 1 Suwawa to see student learning outcomes in a practical and efficient manner. This feature will present two menus, namely practice questions and quizzes. In the about feature, there are three menu options, namely the developer profile, application usage instructions and references. In the developer profile, the researcher has attached the researcher's personal data as the developer starting from full name, place, date of birth, developer profile photo, residential address, education ever held, developer work experience, developer email,



developer's learning media platform that can be contacted and contact number. developer phone.

Fourth, the product implementation stage in the form of learning media on employment material in the form of an android-based application will then be implemented at SMAN 1 Suwawa. Implementation of learning media in the form of android-based applications that have been developed in real situations, namely class. During implementation, the design model or media that has been developed is applied to actual conditions. The material is delivered according to the model or new media developed. The applied medium is complete. Then the researchers limited this research to product development and product improvement without conducting an evaluation process. The implementation process is continued by submitting the application to the learning subject teacher at SMAN 1 Suwawa so that it can continue to be implemented and can continue to assist teachers as educators in the teaching and learning process for learning subjects, especially on employment material.

## Discussion

This research is a type of development research. The materials developed in this study are learning media in the subject of learning for employment material in SMAN 1 Suwawa. The initial problem faced by educators when researchers made observations at research sites was the lack of interest in student learning in employment subjects. This is evidenced by the activities of students who only focused on scrolling their cell phones and did not pay attention to the teacher's explanation during the teaching and learning process.

The development of learning media has now been mutually welcomed by information technology. Various technologies can be developed to become up-to-date learning media in the sense that they are updated according to the times. One of the solutions that researchers offer is the development of android-based learning media on employment material in the SMAN 1 Suwawa.

This front page contains the logo of Gorontalo State University as the identity of the researcher as the application developer who designates the application development for the completion of the Masters program taken at the UNG Postgraduate Program. The front page of this application contains a welcome page. The welcome page displays an image of high school children reading a book, this symbolically displays the application used as a medium for delivering learning material to students at the high school level.

Students can also see the name of the researcher as the developer and the material taught through this learning media in the upper left corner of the welcome

page. In the upper right corner students will be faced with instructions to touch "start learning" to start using the application. Through this front page, students will not be directly confronted with the features presented by the application but will first get to know what application the developer will present.

When students touch "start learning" then they will be faced with the home page. Here it contains an explanation of the application of Android-based learning media aimed at students in teaching and learning, especially about employment. The application in general will contain learning materials, learning videos and practice questions which will be useful for students in measuring their understanding both in the school environment and independently at home.

The delivery of basic competencies and learning objectives is considered important to be conveyed to students in facilitating teachers in communicating the purpose of teaching and learning activities to students so that students can carry out the learning process more independently. By displaying basic competencies and learning objectives, teachers as well as users of learning media can align what methods will be used during the learning process and it is easy to prepare teaching materials. Because the learning objectives serve as a reference for both students and teachers, the components of the learning design must be formulated precisely and precisely by taking into account the behavior and actual abilities that must be possessed by students and after teaching and learning activities are completed it can become a unanimity of competence.

Learning material pages have been adapted to learning objectives. This is done so that the goals to be achieved during the teaching and learning process can be achieved through the features of learning materials. Of course, if the learning material is not in accordance with the learning objectives, then the expected final results will be biased. So that the learning material in this feature is divided into the notions of employment, employment opportunities, and the workforce, how to improve the quality of the workforce, the wage and salary system that applies in Indonesia, the causes of unemployment and the negative effects of unemployment and how to overcome the problem of unemployment in Indonesia.

The evaluation question page is to the right of the material features. This is so that when students finish studying employment material, students can immediately choose the evaluation question feature that is right next to the right feature afterwards. On the evaluation question page, the researcher displays two menus, namely practice questions and quizzes.

The about page will contain some information regarding the profile of the researcher as the developer,

the application guide menu and the reference menu. This developer profile will contain the developer's address, the developer's educational history, the developer's work experience history, the developer's media platforms that can be contacted, the developer's active email and the developer's active phone number. All matters relating to the development of learning media applications that both students and teachers wish to ask can be directly asked through the available developer profiles. The developer is open to all forms of constructive input, criticism and questions.

This research has relevance to previous research but is also different from previous research. Such as research with the title "Development of Ludo Learning Media in learning Class XI SMA Purnama Trimurjo. By Ningsih dan Pritandhari (2019). The purpose of this study is to produce valid ASEAN learning media. This research is research and development with Sugiyono's 4D development model. The development stage consists of define, design, development and dissemination. It can be concluded that ludo learning media is suitable for use as an learning medium and can facilitate students in learning activities. The similarity of this study is that both use learning media development methods, but the difference is in the learning media developed in previous studies, namely LUDO learning media, while this research is Android-based learning media (Ningsih & Pritandhari, 2019).

In addition, the research entitled "Development of learning Pocket Books as Learning Media to Increase Motivation to Study learning for Students XI of SMA Negeri 2 Banguntapan. By Primesstianissa (2016). This study aims to develop learning media in the form of learning Pocket Books for students; determine the feasibility of the learning Pocket Book as a learning medium based on the assessment of material experts and media experts; know the assessment of students with the pocket book as a learning medium; and knowing the increase in students' learning motivation after the development of learning pocket books. This research is a type of research development or Research and Development (R&D). The results of the assessment of material experts obtained an average score of 3.56 which was included in the Eligible category, media experts obtained an average score of 3.91 which was included in the Eligible category, the assessment of small trial students obtained an average score of 4.23 which included in the Eligible category, and the assessment of field trial students with an average score of 4.06 which is included in the Eligible category. The similarity of this research and previous research is that both use development research on learning subjects, but the difference lies in the learning media used previously, namely pocket book media, while this research will develop an android application as a teaching medium

that summarizes learning objectives, learning videos and quizzes (Primesstianissa, 2016).

To strengthen this research, the researcher also referred to other previous research is learning media based on Articulate Storyline 3 in increasing student learning motivation. The type of research used is development research while the conclusion of the research is that learning media based on Articulate Storyline 3 is valid, practical and effective in increasing student learning motivation. The similarity of this research and research Previously, both used development research methods, but the difference lies in the learning media developed in this study, namely Android-based learning media, while in the previous research, it was based on Articulate Storyline 3 (Yulistya et al., 2022).

## Conclusion

Based on the results of research on the development of android-based application learning media on employment material, researchers can conclude that this learning media underwent a revision process from previously only containing features of learning objectives, learning materials and practice questions then changed and experienced additional features. into home features, KD features & objectives, learning material features, practice questions feature, and features about the application. Then the ADDIE development model that has been adapted and modified can produce good and quality learning media with the final validation results from media expert validators, material experts and linguists agreeing on the feasibility of learning media to be tested. The student response was 94.50% in the "very strong" category.

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## Author Contributions

Authors listed in this article contributed to the research and development of the article.

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## Conflicts of Interest

In writing this article, we sincerely declare that there are no relevant conflicts of interest that could affect the objectivity and integrity of the results

## References

Agnesiana, B., Mahendika, D., Rumfot, S., & Sukmawati, E. (2023). The Analysis of Teacher Efforts to

- Developing Students Interpersonal and Intrapersonal Intelligence in Learning Activities. *Journal on Education*, 05(04), 11661–11666.
- Andriyani, N. L., & Suniasih, N. W. (2021). Development of Learning Videos Based on Problem-Solving Characteristics of Animals and Their Habitats Contain in Ipa Subjects on 6th-Grade. *Journal of Education Technology*, 5(1), 37–47. <https://doi.org/10.23887/jet.v5i1.32314>
- Bandi, A., & Sherpa, L. (2023). Android Malware Detection Using Machine Learning Classifiers. In *Lecture Notes on Data Engineering and Communications Technologies* (Vol. 141). [https://doi.org/10.1007/978-981-19-3035-5\\_15](https://doi.org/10.1007/978-981-19-3035-5_15)
- Bens, S., Kolomitro, K., & Han, A. (2021). Curriculum development: enabling and limiting factors. *International Journal for Academic Development*, 26(4). <https://doi.org/10.1080/1360144X.2020.1842744>
- Cárdenas-Quispe, A., Vergaray-Mezarina, R., & Gamboa-Cruzado, J. (2021). Machine Learning for Malware Detection on Android: Systematic Review of the Literature. *RISTI - Revista Iberica de Sistemas e Tecnologias de Informacao*, 2021(E45).
- Churiyah, M., Sholikhan, S., Filianti, F., & Sakdiyyah, D. A. (2020). Indonesia Education Readiness Conducting Distance Learning in Covid-19 Pandemic Situation. *International Journal of Multicultural and Multireligious Understanding*, 7(6), 491–507. <https://doi.org/10.18415/ijmmu.v7i6.1833>
- Ellyzabeth Sukmawati, Iwan Adhicandra, & Nur Sucahyo. (2022). Information System Design of Online-Based Technology News Forum. *International Journal Of Artificial Intelligence Research*, 1.2. <https://doi.org/https://doi.org/10.29099/ijair.v6i1.2.593>
- Erni, E., Adetiya, W., & Yuberti, Y. (2021). Development of Android Based Mobile Learning Media Using Android Studio On Natural Science Subject In Elementeru School. *JIP Jurnal Ilmiah PGMI*, 7(2). <https://doi.org/10.19109/jip.v7i2.10465>
- Fitriandari, M., & Winata, H. (2021). Manajemen Pendidikan Untuk Pembangunan Berkelanjutan Di Indonesia. *Competence : Journal of Management Studies*, 15(1). <https://doi.org/10.21107/kompetensi.v15i1.10424>
- Irsanti, S. W. (2017). Pengembangan Media Pembelajaran Ekonomi Berbasis Video Untuk Meningkatkan Manat dan Prestasi Belajar Siswa Kelas X IPA 2 Tahun Ajaran 2016/2017 SMA Negeri 9 Yogyakarta. Universitas Negeri Yogyakarta.
- Khasanah, K., & Rusman, R. (2021). Development of Learning Media Based on Smart Apps Creator. *AL-ISHLAH: Jurnal Pendidikan*, 13(2). <https://doi.org/10.35445/alishlah.v13i2.549>
- Knox, J. (2020). Artificial intelligence and education in China. *Learning, Media and Technology*, 45(3), 298–311. <https://doi.org/10.1080/17439884.2020.1754236>
- Lim, J., & Richardson, J. C. (2021). Predictive effects of undergraduate students' perceptions of social, cognitive, and teaching presence on affective learning outcomes according to disciplines. *Computers and Education*, 161. <https://doi.org/10.1016/j.compedu.2020.104063>
- Liu, K., Xu, S., Xu, G., Zhang, M., Sun, D., & Liu, H. (2020). A Review of Android Malware Detection Approaches Based on Machine Learning. *IEEE Access*, 8. <https://doi.org/10.1109/Access.2020.3006143>
- Martzoukou, K., Fulton, C., Kostagiolas, P., & Lavranos, C. (2020). A study of higher education students' self-perceived digital competences for learning and everyday life online participation. *Journal of Documentation*, 76(6), 1413–1458. <https://doi.org/10.1108/JD-03-2020-0041>
- Musa, M., Sukmawati, E., Mahendika, D., Muhammadiyah Kupang, U., H Ahmad Dahlan, J. K., Putih, K., Oebobo, K., Kupang, K., Tenggara Timur, N., Negeri Gorontalo, U., Jend Sudirman No, J., Timur, D., Kota Tengah, K., Gorontalo, K., Serulingmas, S., Raya Maos No, J., Cilacap, K., Tengah, J., Tinggi Teknologi Bontang, S., Timur, K. (2023). The Relationship between Students' Spiritual and Emotional Intelligence with Subjects Learning Outcomes. *Journal on Education*, 05(04).
- Muzaffar, A., Ragab Hassen, H., Lones, M. A., & Zantout, H. (2022). An in-depth review of machine learning based Android malware detection. In *Computers and Security* (Vol. 121). <https://doi.org/10.1016/j.cose.2022.102833>
- Ningsih, S. A., & Pritandhari, M. (2019). Pengembangan Media Pembelajaran Ludo Pada Mata Pelajaran Ekonomi Kelas XI SMA Purnama Trimurjo. *PROMOSI (Jurnal Pendidikan Ekonomi)*, 7(1), 50–59. <https://doi.org/10.24127/pro.v7i1.2039>
- Palestina, R. L., Pangan, A. D., & Ancho, I. V. (2020). Curriculum Implementation Facilitating and Hindering Factors: The Philippines Context. *International Journal of Education*, 13(2). <https://doi.org/10.17509/ije.v13i2.25340>
- Primesstianissa, S. (2016). Pengembangan Buku Saku Ekonomi Sebagai Media Pembelajaran Untuk Meningkatkan Motivasi Belajar Ekonomi Siswa. Universitas Negeri Yogyakarta.
- Puspitarini, Y. D., & Hanif, M. (2019). Using Learning

- Media to Increase Learning Motivation in Elementary School. *Anatolian Journal of Education*, 4(2), 53-60. <https://doi.org/10.29333/aje.2019.426a>
- Said, K., Kurniawan, A., & Anton, O. (2018). Development of media-based learning using android mobile learning. *Journal of Theoretical and Applied Information Technology*, 96(3).
- Sholihah, M. (2016). Pengembangan Media Pembelajaran Ekonomi Berbasis Mobile Learning Berbantuan iSpring untuk Meningkatkan Hasil Belajar Siswa. Universitas Sebelas Maret.
- Sierra, J. (2020). The potential of simulations for developing multiple learning outcomes: The student perspective. *International Journal of Management Education*, 18(1). <https://doi.org/10.1016/j.ijme.2019.100361>
- Simamora, R. M. (2020). The Challenges of Online Learning during the COVID-19 Pandemic: An Essay Analysis of Performing Arts Education Students. *Studies in Learning and Teaching*, 1(2), 86-103. <https://doi.org/10.46627/silet.v1i2.38>
- Su, S.-W. (2012). The Various Concepts of Curriculum and the Factors Involved in Curricula-making. *Journal of Language Teaching and Research*, 3(1). <https://doi.org/10.4304/jltr.3.1.153-158>
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta, CV.
- Sugiyono. (2018). *Metode Penelitian Kualitatif, Kuantitatif, dan R&D*. CV. Alfabeta.
- Sukmawati, E., Heri Fitriadi, Mk., Yudha Pradana, M., Dumiyati, Mp., Arifin, Mp., Sahib Saleh, Mp. M., Hastin Trustisari, Mp., Pradika Adi Wijayanto, Ms., Khasanah, Mp., & Kasmanto Rinaldi, Mp. (2022). *Digitalisasi Sebagai Pengembangan Model Pembelajaran*. Penerbit Cendikia Mulia Mandiri.
- Sumarmi, Bachri, S., Irawan, L. Y., & Aliman, M. (2021). E-module in blended learning: Its impact on students' disaster preparedness and innovation in developing learning media. *International Journal of Instruction*, 14(4). <https://doi.org/10.29333/iji.2021.14412a>
- Surahman, S., Hasniah, H., & Ahiri, J. (2020). Identifikasi Faktor Penyebab Kesulitan Belajar Siswa Pada Mata Pelajaran Ekonomi Kelas X IIS Di SMA Negeri 1 Maginti Kabupaten Muna Barat. *Jurnal Online Program Studi Pendidikan Ekonomi*, 5(4), 140-144. <https://doi.org/10.36709/jopspe.v5i4.13433>
- Vanjire, S. S., & Lakshmi, M. (2022). MDTA: A New Approach of Supervised Machine Learning for Android Malware Detection and Threat Attribution Using Behavioral Reports. In *Lecture Notes on Data Engineering and Communications Technologies* (Vol. 68). [https://doi.org/10.1007/978-981-16-1866-6\\_10](https://doi.org/10.1007/978-981-16-1866-6_10)
- Vo, M. H., Zhu, C., & Diep, A. N. (2020). Students' performance in blended learning: disciplinary difference and instructional design factors. *Journal of Computers in Education*, 7(4). <https://doi.org/10.1007/s40692-020-00164-7>
- Wen, L., & Yu, H. (2017). An Android malware detection system based on machine learning. *AIP Conference Proceedings*, 1864. <https://doi.org/10.1063/1.4992953>
- Winden, W. van, Hagemans, I., & Hemert, P. van. (2019). The street-wise university: The Amsterdam knowledge mile as an intermediary and place-making concept. *Social Sciences*, 8(8), 1-16. <https://doi.org/10.3390/socsci8080229>
- Yulistya, A., Suarman, S., & Riadi, R. . (2022). Pengembangan Media Pembelajaran Ekonomi Berbasis Articulate Storyline 3 dalam Meningkatkan Motivasi Belajar Siswa pada Materi Manajemen SMA Kelas X. *Jurnal Pendidikan Tambusai*, 6(2), 12578-12587.