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Development Of Android-Based Mobile Learning In Financial Accounting Subject Class Xi Accounting At Smk Negeri 10 Surabaya

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ABSTRACT

Procurement of this research is intended to explore the development and use of AndroidBased Mobile Learning Media in accounting compartments for class XI accounting in SMK Negri 10 Surabaya. The method of this research is research and development through 4D development methods consisting of four levels: definition, design, development, and dissemination. The equipment used is an extra review sheet, expert verification leaves, and student questionnaire. The final result of the expert verification of the document is 89%. On average, all achieved verification results were 86.46% of the "very executable" category. As a result of a limited survey of student responses to mobile learning media, the average overall percentage of the "very understanding" category was 96.83%. From these results, can conclude that the developed Android-based mobile learning media is "very suitable" to use in the learning process.

1. Introduction

In the current era, progress in the distribution of information in the form of digital is unavoidable and very influential in the world of education. To improve the quality of education, the compulsory education sector can adjust technological developments in an increasingly advanced era through positioning its use in the learning process in schools (Setyadi, 2017). It is stated in Article 1 paragraph 1 of the Law on the National Education System No. 20 of 2003 which states that it encourages students to cultivate a religious spirit and personal capability. Education can make individuals who are useful for life and can act humanely, both in the nation and state and in the life of the individual itself (Rahmawati, 2019). To achieve a goal, better education is needed. The success of increasing the quality of a country's human resources lies in the quality of its education. The purpose of education has been embedded in the opening of the 1945 Constitution which reads "to educate the life of the nation and participate in carrying out world order". The development of science and technology is so significant, it makes every human being quickly and respond to follow these developments. Human resources are needed and required to have the ability to respond to the development of science and technology. Logical, critical, structured, creative thinking and the desire to work together effectively are needed to develop the ability to understand technological developments (Hafidz et al., 2019).

In general, a lot of learning is centered on the teacher center, so there needs to be a change from teacher center to student center. The teacher is a facilitator, student-based learning helps students grow their understanding. To encourage students and create learning concepts through what has been learned, the teacher acts as a facilitator who is obliged to create a learning environment for students who contribute to learning activities (Azimatun Ni'mah, 2021). In the learning environment, students are relatively competitive individually, don't care about friends, have a closed nature to the surrounding environment, make friends selectively, have a high sense of individualism and others. Therefore, it is necessary to implement the use of android-based learning media which is expected to solve this problem.

In order to realize learning goals, the world of education cannot be separated through a learning process that includes students, teachers and a learning environment that influences each other (Dianti & Hakim, 2021). One of several factors that support the achievement of learning objectives is the media (Prasetyo,

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2018). To facilitate students' understanding, a media should be able to provide motivation and make students interested in learning and visualize the abstract material that the teacher teaches so that it makes it easier for students to understand the teaching material (Saputri & Susilowibowo, 2020). As stated (Aini et al., 2018) that the use of varied and appropriate media in the learning process can increase students' learning motivation and can reduce their passive attitude. In the learning process, students need books or teaching materials to support the material they are learning. According to (Widiastika et al., 2020) that learning tools are learning bases or physical aids, including instructional materials about the student environment, can inspire students. A tool that has a function and can be used to convey a learning message is a learning medium (Susilowati, 2017). Learning media has a purpose as learning aids to facilitate teaching and learning activities in the classroom and outside, to help increase concentration in teaching and learning activities, and to increase the efficiency of the learning process (Hardinata et al., 2018). Various types and forms of learning media that can be used by educators can be used as a source of insight for students (Siswanto, 2021). Along with advances in the fields of technology and communication and the dynamics of the learning process are found, so that the implementation of teaching and educational activities is increasingly demanded and obtains learning media that have wide variations (Anam, 2021).

The attractiveness of the media through product presentation and the practicality of learning media to use are very important things to highlight. To make it easy for students to understand a material, learning media must be packaged as attractively as possible (Pratiwi & Listiadi, 2021). Android-based learning media in the form of applications is one of several learning media that is often used to solve the problem of low student interest in the learning process and bringing books to school (Wiro'i & Sulistyowati, 2021). Cellular phones are a form of rapid development of mobile technology today. Many students have more than one cell phone and almost 90% of students must have had a cell phone. The greater the opportunity for the use of technological devices in the world of education and accompanied by the increasing number of students who own and use mobile devices. Mobile learning is a learning media that uses mobile technology. One of a number of options for developing learning media is mobile learning. As stated (Nugraha, 2016) that the existence of mobile learning is intended to complement teaching and learning activities and provide opportunities for students to understand material that has not been understood anytime and anywhere. Therefore, m-learning is an appropriate learning media that can help students' teaching and learning activities in line with the growing era (Saputri & Susilowibowo, 2020).

Based on the results of observations carried out in class XI AKL 2 SMK Negeri 10 Surabaya with a total of 36 students, all of whom have their own cell phones. However, there are 2 students who have an iPhone smartphone with an iPhone operating system operating system and the majority of 34 students use an Android smartphone. At SMK Negeri 10 Surabaya there is currently no learning media that uses cell phones. To support learning in schools today, many students use laptops and there are still people who use manuals and do not even have books or material guides. A student feels heavy and seems bothered when using a laptop as a learning medium. Students feel bored when teachers still use conventional methods in the process of learning activities (Silca Miraz Fadhillah, n.d.). In learning accounting at this school, educators still use the lecture method so students feel bored and decide to do things outside of learning such as chatting, joking with friends and playing with their phones. A teacher who does not optimize technological developments results in less variety of media used in the learning process and this is not solely the teacher's fault.

Seeing these conditions, the development of appropriate learning media through the use of mobile phones is to create learning media based on Android in the form of applications intended for all cellular phones whose platform is Android or can even be obtained from platforms outside of this. Android is a Linux-based system intended for mobile devices. This is because the operating system has turned into a system that is most often used for smartphones. According to Widiastika et al., 2020) that Android is an operating system that is very popular in the community because it has advantages such as giving developers the freedom to create applications. In addition to an affordable price with a price range of 2 million rupiah, Android smartphones are also more practical and simple. As stated by EMS (2015) that Android can easily be referred to as software that is used for mobile devices which includes operational systems, middleware and key applications that Google releases. In 2022, Android dominates 84.1% of the smartphone market share worldwide according to IDC data, iPhone occupies the second position at 11.7%, followed by Windows Phone in the third position at 2.9%. In addition to making it easier for users, the Android developer has provided free and paid applications. Currently the Play Store already provides many applications and users only need to download and install them into smartphones.

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A product or software from Adobe that is used for the process of making and processing images or animations that use vectors for small scale, namely Adobe Flash CS6 which is the creation of learning media that provides convenience in use and application (Wulandari et al., 2019). We can also create or develop games, learning media or interactive teaching materials, advertising banners, quizzes and others through Adobe Flash CS6. The learning materials listed can be in the form of links, text, videos, pictures and interactive quizzes. Files that can be generated through the software use the .Swf extension and can be played or played using a browser or page where the condition is that the Adobe Flash plugin has been downloaded or using other software that can play .Swf format files.

As a supporter, there are relevant researches on Android-based mobile learning learning media including the research that (Wulandari et al., 2019) did, the results of the study stated that "the application received an assessment of 86.93% through media experts and 87% through material experts. . Meanwhile, the trial results show the value of the ease and usefulness of using the application as much as 87.5% by teachers and 82.27% by students." shows that the media is very appropriate to use, simple, and useful in the learning process. Then the research submitted (Aini et al., 2018) the results of the study show that learning media with an Android base are very suitable to be used during the learning process. Furthermore, linear research has also been carried out (Wiro'i & Sulistyowati, 2021) was carried out, the results of the research were proven by the results stated, namely "expert validation of material 1 which has a percentage of up to 92%, material 2 of 98%, validation of media experts as much as 80% and small group trials got 80% and field trials got 87%, thus the development of this learning media obtained very feasible criteria to be applied to SMKN 1 Surabaya."

Therefore, through the explanation above, the authors are motivated to develop an Android-based mobile learning media for financial accounting subjects in class XI accounting at SMK Negeri 10 Surabaya. Students will find it easier to learn through smartphone media because it is more practical to use anytime and anywhere. This research is carried out is useful. produce products in the form of android-based mobile learning learning media in financial accounting subjects, to determine the feasibility of android-based mobile learning media developed to increase the effectiveness of learning outcomes in financial accounting subjects for class XI accounting at SMK Negeri 10 Surabaya, to determine student responses to Android-based learning media for mobile learning on financial accounting subjects.

2. Method

This research adopts a 4-D development model sourced (Thiagarajan, Sivasailam, 1974) through the stages: Define, Design, Develop, and Disseminate (Thiagarajan, Sivasailam, 1974). The reason for choosing the 4-D model is because each development step is arranged systematically so that implementation can be controlled. Researchers conduct studies only up to the develop stage, because the budget and time are limited and aligned with the needs of researchers who focus only on product development. The subjects used in this study were students from class XI Accounting at SMK Negeri 10 Surabaya. The trial test is limited to only 20 students.

The first stage is define, in this stage, researchers analyze the needs in developing and study a number of factors in the development process, namely: front-end analysis, students, subject matter, questions and objectives in learning. The design stage of creating learning media includes compiling learning materials, determining media, formats and designing media prefixes. Next is the develop stage where there are activities to review and validate the material, language and media. In accordance with the inputs and suggestions obtained through the experts, these are then revised to make the appearance and content conveyed to the product more effective, more precise and easy to use. The final step is testing to find out student responses to the manufacture of updated products.

The form of data in research is qualitative and quantitative data obtained through the results of the study and validation by material, language and media experts. (Sugiyono, 2016) states that "quantitative data is data in the form of numbers or quantitative data that is numbered, while qualitative data is data in the form of words, schemes, and pictures". The research instrument was carried out to collect some data through distributing questionnaires to experts and students (Sugiyono, 2016). There are 2 types of questionnaires distributed, namely open questionnaires and closed questionnaires. According to, (Sugiyono, 2016) "questionnaire or questionnaire is a data collection technique which is done by giving a set of written questions to respondents to answer".

After the research was carried out and all the questionnaires were collected, the next step was to analyze the data. Data analysis that needs to be carried out when data and information has been obtained is descriptive qualitative and quantitative analysis by averaging the assessment of each validator per item. The benefit of qualitative data analysis is to process the data obtained by experts. While the benefit of quantitative data analysis is to see the results of the validation and feasibility of this product. Analysis of the questionnaire data in the following ways:

$$\text{Percentage} = \frac{\text{Accumulated Total Score } x\ 100\%}{\text{Maximum Score Accumulation}}$$

If the percentage results are known, then they are interpreted into predetermined criteria. Below is a table of assessment aspects of material, language and media expert validation through a Likert scale.

TABLE 1
LIKERT SCALE CRITERIA

Criteria	Value/Score
Very good	5
Well	4
Currently	3
Not good	2
Very Not Good	1

TABLE 2
EXPERT VALIDATION INTERPRETATION CRITERIA

Average score (%)	Interpretation Criteria
0-20	Very Inappropriate
21-40	Not feasible
41-60	Decent enough
61-80	Worthy
81-100	Very Worthy

The results through filling out student response questionnaires using a Likert scale are described in table 3:

TABLE 3
INTERPRETATION CRITERIA FOR STUDENT OPINION SCORES

Average score (%)	Interpretation Criteria
0-20	Very Uncomprehending
21-40	Do not understand
41-60	Enough Understanding
61-80	Understand
81-100	Very Understanding

conclusion obtained from tables 1, 2 and 3 is that if the overall percentage of the average assessment through the validation results of experts is >61%, it can be said to be feasible or very feasible. If the overall percentage of the average assessment through the validation results of experts is > 61%, it can be said to understand or really understand. So the product developed is effective and feasible or very feasible to be applied and used in learning activities at SMK Negeri 10 Surabaya.

3. Result and Discussion

The development of android-based mobile learning in financial accounting subjects for class XI is classified as research and development with a 4-D model. The development of Android-based mobile learning uses 3 stages of the development process consisting of the stages of definition, planning and development.

Defining stage, the goal in this stage is to define the basic problems needed in development activities and identify the tools used by researchers to start the analysis. There are rules that must be enforced, such as starting and ending studies, analyzing student responses or reactions, reviewing learning assignments, analyzing development concepts and learning objectives. In connection with a study conducted by researchers at SMK Negeri 10 Surabaya, they encountered a problem during the learning process, namely the lack of assistive media which caused students to feel excited in the learning process in class so they only

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studied using reference manuals. This can cause students to be hampered in understanding the material. This problem was found in class XI Accounting at SMK Negeri 10 Surabaya. So that in the current stage, researchers find a way out, namely the need for supporting teaching materials that are in line with the skills, knowledge and experience of students.

The planning stage (design) in which researchers create learning media includes compiling materials, determining media, formats and the initial composition of the media. The media used is Adobe Flash CS6, which is software from Adobe which is used for the process of creating and processing images or animations that use vectors on a small scale (Wulandari et al., 2019). The software is to create applications and animations that are non-internet use. Files generated through the software use the extension.Swf. The programming language is action script where version 2.0 is for desktop platform users and version 3.0 is for mobile platform use. Adobe flash cs6 is the newest type.

Below is the design for the development of mobile learning media:

a. Play button: used to start the application until the application cover appears.
b. Start button: used to show the menu contained in the mobile learning media.
c. Instructions button: used for instructions on how to use mobile learning media.
d. Right and left directional buttons: used to continue the page and return to the previous page.
e. Rotate arrow keys: used to return to the original menu.
f. Basic competency button: used to show KD subjects.
g. Indicator button: used to show indicators of achievement of each KD.
h. Material button: used to show content and videos.
i. Profile button: used to show the developer profile.
j. Quiz button: used to show questions.
k. Quiz start button and submit: used to work on or solve questions.
l. Quiz review button: used to re-show the results obtained through the questions that were worked on.
m. Close review button: used to close the question review.
n. Next button: used to continue the question and see the results of the question and return to the menu.

Figure 1. Display of cover media

In the development stage, researchers at this stage develop using the Adobe Flash CS6 application as a mobile learning learning medium. When this media is finished, the next step is the process of reviewing the experts. At this stage, a review sheet is needed containing input and suggestions from experts as a reference in order to perfect the learning media that is being developed. The revision process through the input of experts will create learning media products which will then be validators of the feasibility value. This feasibility was assessed through an expert validation sheet composed of material fields by an accounting education lecturer at FEB Unesa and a financial accounting subject at SMK Negeri 10 Surabaya, language experts by an FBS Unesa lecturer and media experts by an Education Technology Lecturer at FIP Unesa. Materials experts will evaluate and validate aspects of the feasibility of the material and the presentation of the material. Linguistics experts assess grammatical aspects as well as media experts on application sizes,

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illustrations and graphics. Eligibility is obtained through the validation results of experts, namely material, language and media experts. The score obtained will be calculated and analyzed using the percentage method which is then interpreted according to theory (Riduwan, 2018). Below is the presentation of the final score obtained through the assessment of the expert validator:

TABLE 4
OBTAINING MATERIAL FEASIBILITY VALIDATION

No.	Subject	V1	V2	Percentage	Interpretation
1.	Material Coverage	93,33%	80%	86,66%	Very Worthy
2.	Material Accuracy	86,66%	93,33%	89,99%	Very Worthy
3.	Recency and Contextual	86,66%	93,33%	89,99%	Very Worthy
4.	Presentation Technique	90%	90%	90%	Very Worthy
5.	Material Presentation Support	85%	97,5%	91,25%	Very Worthy
6.	Learning Presentation	86,66%	86,66%	86,66%	Very Worthy
	Eligibility Average	**88%**	**90%**	**89%**	Very Worthy

Referring to the results obtained, this learning media on the feasibility of the content obtained a value of 88.88% and for the feasibility of the presentation it obtained a value of 89.30% with an average material feasibility of 89%. With an average result of 89% according to theory (Riduwan, 2018) if the value exceeds > 61% it can be categorized into the interpretation of "Very Appropriate" so it can be concluded that this Android-based mobile learning learning media is "Very Appropriate" to be used in learning activities. The results of the feasibility percentage on the material aspect were obtained from the average results of two validators in the field of financial accounting material, namely Unesa Accounting Education Lecturers and Financial Accounting Teachers. These results were obtained because of the presentation of the material in this learning media in the form of applications and videos, making it easier for students to understand financial accounting material. Furthermore, the material is also presented using sample questions and illustrative images so that students can easily understand the procedure for each question presented. Practice questions that have been designed for students that can be done to improve their abilities. This is due to the fact that the learning media is designed using materials according to KD and available social exercises, students can also understand easily because the language used is aligned with their characteristics and the application operating system is not complicated. This is in line with research (Wiro'i & Sulistyowati, 2021) which states that the development of Android-based mobile learning learning media is very suitable for use in the learning process and can increase students' enthusiasm for learning. Another study was also conducted (Nurvia Dwi, 2020) which obtained an average material feasibility of 89.13% which was categorized as very feasible.

TABLE 5
OBTAINING LANGUAGE ELIGIBILITY VALIDATION

No.	Subjek	Persentase	Interpretasi
1.	Conformity to the Development of Learners	100%	Very Worthy
2.	Legibility	80%	Worthy
3.	Motivating Ability	80%	Worthy
4.	straightforwardness	90%	Very Worthy
5.	Coherence and Coherence of the Line of Thinking	80%	Worthy
6.	Conformity with Indonesian Language Rules	80%	Worthy
7.	Presentation Technique	86,66%	Very Worthy
Eligibility Average		**85,23%**	**Very Worthy**

From the acquisition of the validation, it was found that the suitability aspect of this learning media includes the suitability of students' cognitive development in the very appropriate category with a percentage of 100%. The readability aspect which includes students' understanding in receiving the material and symbols given is in a proper category with a percentage of 80%. The aspect of the ability to motivate students which

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includes the ability to motivate students to be active and think critically gets a decent category with a percentage of 80%. Aspects of grammatical straightforwardness in this learning media include the accuracy of sentence structures and grammatical standards that are not complicated and easy to understand. Students get a very decent category with a percentage of 90%. Aspects of coherence and coherence in the student's flow of thinking which includes the integrity of conveying meaning and messages between chapters and sub-chapters as well as paragraphs get a decent category through a percentage of 80%. Aspects of harmony in the rules of the Indonesian language based on the General Guidelines for Indonesian Spelling (PUEBI) obtained a proper category with a percentage of 80%. Aspects of presentation techniques that include the accuracy of the use of writing terms, scientific names and symbols or symbols get a very decent category through a percentage of 86.66%. In accordance with these results, this learning media is included in the "Very Eligible" category with an average percentage of language eligibility of 85.23%. The percentage result of this validation is obtained through the accumulation of validator assessments in the field of language from Lecturers of the Department of Indonesian Language and Literature. This is because in the development of this learning media using communicative language that is harmonized with the character of students. And also the use of coherent language in neat arrangement of letters and spelling, as a result the material presented can be easily absorbed by students. With the average language feasibility result, which is 85.23% according to theory (Riduwan, 2018) if the value exceeds > 61% it can be categorized in the interpretation of "Very Feasible" so it can be concluded that this Android-based mobile learning learning media is "Very Appropriate" to be used in activities learning. This result is the same as the development carried out by (Silca Miraz Fadhillah, n.d.) who obtained 93% language validation feasibility results in the very feasible category. Other research was also carried out (Saputri & Susilowibowo, 2020) with a language suitability of 78.57% in the appropriate category.

TABLE 6
OBTAINING MEDIA ELIGIBILITY VALIDATION

No.	Subjek	Persentase	Interpretasi
1.	Mobile Learning App Size	80%	Worthy
2.	Operation Technique	90%	Very Worthy
3.	Mobile Learning Application Cover Design	84%	Very Worthy
4.	Cover Design for Mobile Learning Application Content Section	86,66%	Very Worthy
Eligibility Average		**85,16%**	**Very Worthy**

Through the above results, it shows the feasibility of the media aspects of this learning media, the size aspect of the Android-based mobile learning learning media includes the size of the application and the alignment of file sizes with the material to get a decent category where the percentage is 80%. The technical aspects of the operation of the learning media include the ease of use, the simplicity of the program being run, and the suitability of the operation of the program with the development of students, including the very feasible category with a percentage of 90%. Aspects of the initial menu cover display including layout, color combinations, font selection, and delivery of messages to students get a very decent category where the percentage is 84%. The design aspect of the cover of the content section includes button layout, combination of text, color and background as well as selecting the type of text between chapters and sub-chapters to get a very decent category with a percentage of 86.66%. With an average media feasibility result of 85.16% in line with theory (Riduwan, 2018) if the value exceeds > 61% it can be categorized in the "Very Eligible" interpretation so it can be concluded that the learning media developed is "Very Eligible" to be used in learning activities. This is because this learning media uses a number of simple menus and attractive designs, so it can stimulate students' motivation in learning. The appearance and color are also harmonized at the psychological level of students where the goal is to dispel boredom, this application also shows videos of learning material for financial accounting subjects. So that the Android-based mobile learning learning media is considered to be in line with the development of science and technology. The results of media eligibility are accumulated from the score obtained by the media expert validator from the Unesa Education Technology Lecturer who is competent in technology and educational media. These results are consistent with the research that (Wulandari et al., 2019) conducted in research on the development of android-based mobile learning with media feasibility of 86.93% in the very feasible category. Further research was also carried out (Aini et al., 2018) with an assessment of 95% in the very feasible category.

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TABLE 7
EXPERT VALIDATION RECAPITULATION

No.	Assessment Subject	Percentage	Interpretation
1.	Material Eligibility	89%	Very Worthy
2.	Language Eligibility	85,23%	Very Worthy
3.	Media Eligibility	85,16%	Very Worthy
Eligibility Average		**86,46%**	**Very Worthy**

In accordance with table 4, it can be seen that Android-based mobile learning learning is in the "Very Eligible" category with an average eligibility percentage of 86.46%. Based on the theory put forward (Riduwan, 2018) if you get results > 61% it can be categorized in the interpretation of "Very Appropriate" so it can be concluded that this learning media has been "Very Appropriate" to be used in learning activities. This is because this product is designed using the completeness of the material and practice questions, students can also easily receive points from the material because the language used is in line with the characteristics of class XI students with easy operation of the system. The results of this study are in line with the research that (Nur Rahmah, 2018) did with the results of the study getting a very decent category of 90%. Previous research was then carried out by (Nurvia Dwi, 2020) with the results of the study getting a very decent category with a percentage of 87%.

TABLE 8
STUDENT RESPONSE QUESTIONNAIRE RESULTS

No.	Subjek	Persentase	Interpretasi
1.	Content components	96%	Very Understanding
2.	Serving components	97,33%	Very Understanding
3.	linguistic component	97%	Very Understanding
4.	Graphic component	97%	Very Understanding
Eligibility Average		**96,83%**	Very Understanding

In accordance with table 5, the results of student responses to the developed mobile learning learning media obtained the percentage of content eligibility components 96% (very understanding category), 97.33% presentation feasibility (very understanding category), linguistic components 97% (very understanding category) , as well as a graphic feasibility component of 97% (very understanding category). According to data analysis, it is known that the overall average percentage is 96.83% with the category "Very Understanding", so it can be concluded that the mobile learning learning media developed "Very Appropriate" is implemented in the learning process of class XI financial accounting at SMK Negeri 10 Surabaya . Supported by research (Rahmawati, 2019), namely the response of students to get an average value of 88.58% and is included in the category of very understanding. Further research was also carried out by (Nurvia Dwi, 2020) who scored 94.22% of student responses in the category of very understanding. So Android-based mobile learning learning media can be called very feasible to be used in the learning process and effective in making student learning outcomes increase.

4. Conclusion

Research on the development of android-based mobile learning learning media in financial accounting subjects for class XI accounting at SMK Negeri 10 Surabaya adopted the 4-D model from (Thiagarajan, Sivasailam, 1974) which was composed of 4 stages, namely definition, planning, development and dissemination, but researchers only to the development stage. In accordance with the assessment through a number of experts, the development of this learning media on financial accounting subjects for class XI Accounting at SMK Negeri 10 Surabaya is categorized as "Very Eligible" with a percentage of 86.46%. The results of the response of class XI accounting students at SMK Negeri 10 Surabaya obtained the category "Highly Understanding" with a percentage of 96.83%. Thus the development of android-based mobile learning learning media in financial accounting subjects for class XI accounting obtained the "Very Eligible" category to be applied to SMK Negeri 10 Surabaya and effective for use in the process of teaching and learning activities.Suggestion this Android-based mobile learning learning media can be an option for learning media used for learning activities. This learning media is designed so that students can learn anytime and anywhere, therefore students are expected to be able to use this application independently to expand their

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knowledge. "In this Android-based mobile learning learning media, the material is limited to financial accounting material, for further research it can cover broader material.

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