Development of Android-Based Mobile Learning Economic Learning Media with Problem Based Learning (PBL) Flows to Improve Learning Outcomes of High School Students at Negeri 2 Binjai Academic Year 2021/

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Development of Android-Based Mobile Learning Economic Learning Media with Problem Based Learning (PBL) Flows to Improve Learning Outcomes of High School Students at Negeri 2 Binjai Academic Year 2021/2022

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Abstract. The product of this development research is an Android-Based Mobile Learning learning media with Problem Based Learning (PBL) flow to improve student economic learning outcomes. The problem of this research is the low learning outcomes of students at SMA Negeri 2 Binjai. In theory, many influencing factors include still using the usual learning media during the Covid-19 pandemic. This research is a learning media development research using the ADDIE development model which has 5 stages. The data in the study is in the form of learning outcomes with the average during the Covid-19 pandemic year from 2020-2022. This study aims to develop learning media that are more practical and effective for students to use with smartphones. The research design used (ADDIE), the test subjects in this study were students of XI IS SMA Negeri 2 Binjai FY 2021/2022.

Keywords: Learning Media, Mobile Learning, Learning Outcomes, Covid-19, Based on Android, SMA Negeri 2 Binjai

1 Introduction

Economics is one of the important subjects for high school students, especially for students who take the field of social sciences. In economics, one aspect of the assessment that is tested to determine student understanding is the cognitive aspect by looking at student learning outcomes. Learning outcomes can be determined by quality learning activities and of course students are able to absorb the learning. The following table data from student learning outcomes,

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Table 1. data from student learning outcomes

NO	YEAR	KKM LEARNING RESULTS	SEMESTER	AVERAGE RESULT CLASS X-1 - XI IS 1	AVERAGE RESULTS FOR CLASS X-1 - XI IS 2
1	2020	80 -100	ODD	81.40	82.4
2	2021	80 -100	EVEN	78.9	79.4
3	2021	80 -100	ODD	79.4	80.1

From the data above, it is necessary to change the learning media. The teacher has provided a lot of material to students during learning with the *Google Classroom* (GCR) application and the *Whatsapp application* . When learning with this application, students tend to be constrained by networks, quotas and learning media that cannot be used *offline* . So students are only active when the teacher explains on *Google Meet* after being given assignments and additional material students tend not to open when they are ready to go online . This causes learning outcomes to tend to be low because students do not tend to use learning media appropriately.

Based on interviews with teachers of economics subjects, they ask for an analysis of learning media needs and an analysis of teaching media used online in the development of *Mobile Learning learning media* . The teacher gives an opinion on the need for learning media to be with technology that can be used with *smartphones* so that it makes interactive learning media. For the analysis of teaching media, it is necessary to use materials, summaries, syllabus, lesson plans and learning models that can be applied directly to the program. So that teachers can easily apply directly to students.

Teacher can apply learning using *Mobile Learning media* which has been developed to support the learning process during the Covid-19 pandemic. As Suratman, et al (2021:2382) "that the pandemic has changed the learning system in high schools so that technology with learning media can be used to overcome this". Applications that are still often used online are *Google Classroom, Google Meet, Zoom* and *Whatsapp Group* . This application has been widely used but the effect has not yet reached the independent learning process for students. *Google Meet* is most often used by being able to accommodate up to 250 *video conference* accounts for video communication.

Mobile Learning With this PBL flow will be made in the learning process with *Mobile Learning* with a syntax that will be adapted to the learning material. It is hoped that student learning outcomes can increase and the teacher becomes a reference that *Mobile Learning* can be a place for teacher creativity in presenting learning material with the concept of a *smartphone*. *Learning with Mobile rning* media with PBL flow The above can be a solution for teachers in maximizing the learning process according to the current needs of students. *Mobile Learning* learning media is a learning media that utilizes the support of internet technology. In *Mobile Learning* , the teacher does not just upload learning materials that can be accessed *online* and *offline* by students, but the teacher also evaluates, establishes communication, collaborates and manages other aspects of learning. *Mobile Learning* is an

effective learning process that is produced by combining digital delivery of material consisting of support and services in learning.

Learning using *Mobile Learning* with the PBL model can be used as a variation of learning that can reduce student boredom and can stimulate critical thinking skills and independent learning so that students are interested in being active in understanding and solving problems related to the material being studied. With the application of Android-based *Mobile Learning* , it can foster students' attention to learning outcomes, can provide interesting and challenging learning materials for students, can use appropriate and interesting learning aids, and can create a comfortable and fun learning atmosphere for students.

With the above problem that the use of *Mobile Learning* media by utilizing *smartphones,* can be done as an effort to overcome student learning difficulties which are related with the level of cognitive learning outcomes to be achieved by these students. Because by using *Mobile Learning media* , students will be more interested in learning and in addition to using the media the students students can learn anytime and anywhere without having to carry many textbooks which very troublesome. Especially in the 2022 period where learning will be face-to-face with a strict process. So that *Mobile Learning* can also be used online or offline .

Based on the various problems that the author has stated above, writer want to lift study this as the thesis that title: "Development of Android-Based Mobile Learning Economic Learning Media with *Problem Based Learning* (PBL) Flow to Improve Student Learning Outcomes at SMA Negeri 2 Binjai for the Academic Year 2021/2022".

1. Literature Review

a. Learning outcomes

Learning outcomes cannot be separated from learning activities, because learning activities are a process, while achievement is a result of the learning process. Understanding the meaning of learning outcomes in outline must be based on the notion of learning itself. Learning outcomes can also be seen from changes in a person's behavior both in terms of knowledge or attitudes after carrying out both formal and informal learning processes. Learning outcomes cannot be separated from learning activities, because learning activities are a process, while achievement is a result of the learning process. Understanding the meaning of learning outcomes in outline must be based on the notion of learning itself. Learning outcomes can also be seen from changes in a person's behavior both in terms of knowledge or attitudes after carrying out both formal and informal learning processes.

b. Learning Media

By general media is say plural from "medium", which means intermediary or introduction. In Dictionary Big Language Indonesia (KBBI) media means intermediary; liaison; located in between two parties (people, groups, and so on); The word media applies to various activities effort, like media in delivery message, media introduction magnet or hot in field technique. Term media also used in field teaching or education so that the term be a medium of education or learning media.

c. Mobile Learning

Mobile learning (*m-Learning*) defined as all type environment study and spaces which take into account mobility technology, mobility student and mobility study. (Tamimuddin. 2014). Based on definition According to this definition, the definition of learning has evolved following technological developmentsso that in order to gain knowledge, students can acquire it anywhere and whenever, no longer just being in room class. Another opinion is Bambang (2018:63). *Mobile Learning* is a learning model that adopts the development of cellular technology and mobile devices (HP) which are used as learning media. This supports learning media as a combination of technology to advance education.

d. Learning model

Problem Based Learning (PBL) in Indonesian called Problem Based Learning (PBM) is the use of various kinds of intelligence needed to confront real-world challenges, the ability to face everything new and existing complexities. The PBL model was developed based on the concepts proposed by Jerome Bruner. The concept is discovery learning or discovery learning. This concept provides theoretical support for the development of a PBL model that is oriented towards information processing skills. The teacher's PBL learning model must provide a space that is arranged in such a way that it is comfortable and open for competitive exchanging ideas so that students have the opportunity to increase their discoverability and intelligence (Wisudawati and Sulistyowati 2014). :88).

e. Mobile Learning Development With PBL Flow

Mobile technology that supports education in a flexible, accessible and personal way. By using personal technology, students can build knowledge whenever the need arises. This helps develop a culture of lifelong learning. With *Mobile access* to learning content, learning can occur in everyday and unconventional contexts, which promotes lifelong learning (Kukulska & Hulme, 2010). *Mobile Learning* with a combination of PBL models on BUMN, BUMS and Cooperative materials is one of the breakthroughs made by the author. In the *Mobile Learning* software , a problem will be created with the material for BUMN, BUMS and Cooperatives. These problems can make the learning process active with *smartphones*. The material in BUMN, BUMS, and Cooperatives will be made about the performance of BUMN, BUMS and Cooperatives which will stimulate students to be more active in learning

2 Research Design

This study uses a type of research and development *(Research and Development)* which is a research method that is usually used to produce a certain product and test the feasibility of the product (Sugiyono, 2014: 296). The main purpose of research *and development* is not to study or formulate theories, but to produce an effective product for schooling (Putra N. 2015). This research produces a product that can be used in the learning process in the form of an *android -based application* in *a smartphone* . Research on development of a learning media product was conducted to determine the feasibility of the media in the learning process. Therefore, it is necessary to have a research design that has stages so that this research can run in the right direction. The stages of this research are carried out referring to the ADDIE development model which includes *Analysis, Design, Development, Implementation* and *Evaluation*. The stages of this research design were carried out through the *analysis stage* (needs analysis of teaching media and analysis of the teaching media used), *design* (design of

material items to be presented, preparation of material manuscripts, and preparation of the PBL model flow, delivery of material in the form of *flowcharts, development*). making media using software, assessment by revision validation experts), *implementation* (trial), *evaluation* (revision of media from the results of suggestions and comments after a limited trial.

3 Research Results & Discussion

This research produces a product in the form of *mobile learning-based learning media* on *smartphones* with the android *platform* . This product is to a ver the student learning outcomes which are still low with an average of 79. So with this the development of learning media that will be made will help improve student learning outcomes. A *Mobile Learning* product made according to the advice of an economics subject teacher during observations and interviews at SMA Negeri 2 Binjai. The *Mobile Learning product* is made from *Smart Apps Creator 3* with the material a low of the PB model. Instructions from the *Mobile Learning program* will be made easily so that students a ctive in independent learning. In addition, summaries and questions are also made to see student learning outcomes. So it can be seen from the analysis as,

Analysis. Analysis of teaching media needs is carried out based on the needs of learning media in the field e analysis phase was carried out by observing economic learning at SMA Negeri 2 Binjai. Based on the results of observations made, it is known that most of the students have android-based *smartphones* . The analysis phase of teaching media for students is used to analyze the needs of the SMA Negeri 2 Binjai curriculum with the revised 2013 curriculum as recommended by the government. In economics learning, BUMN, BUMS and cooperatives in the Indonesian Economic System are one of the main materials that must be taught in the 2013 curriculum. This is because the material at the time of research was for testing *Mobile Learning products*.

Design. *The storyboard* is used as a guide in making the design view from one page to the next, so that the components on a page can be used to know. *Flow chart* serves to help design the navigation structure from one view to the next. This will clarify the picture of the design of media creation. For clarity, the following is a *flow chart* of the learning media developed. Before the development of learning media is carried out, it can be tested with a small *scoop* , namely with 3 students. Product trials only use *storyboards* to find out interest in the developed learning media. On this small scale, some suggestions from students with *storyboards* should be added animation to the material so that it is real to learn. In the second scale stage w 6 students the *storyboard design* was improved from stage 1 so that they would know to see the development of the *Mobile Learning learning media* . At stage 2, the suggestion is only to see the flow of the learning model so that students can see the orientation of the problem so that students can immediately find a solution to the problem. In Stage 3 for 10 students to see the *storyboard design* that is almost complete, whether it is suitable for use by students to be developed. Suggestions at stage 3 students only ask that the *smartphone* memory size is not large to be used as an android application. After being tested with 3x, the design will be developed so that it becomes a nice display and makes students learning fun.

Development. At this stage of development, the researcher will *build a* program that refers to the *storyboard* and *flowchart* that has been made previously. In addition, at this stage an

assessment of the data collection instrument is carried out by the validator so that there is a validation value and input it into the *Mobile Learning product* .

The results of the application design that have been made on the *smart apps creator will be displayed on* the android program, so that it becomes a learning media product based on *Mobile Learning* . with login and password display.

Fig. 1. *Mobile Learning* . with login and password display

On the *Mobile Learning menu page,* there are five menu options. The menus are Syllabus & RPP, Materials, PBL Flow, Summary and Questions. The syllabus & lesson plan menu contains information about learning which consists of Core Competencies (KI), Basic Competencies (KD), and RPP with PBL Flow.

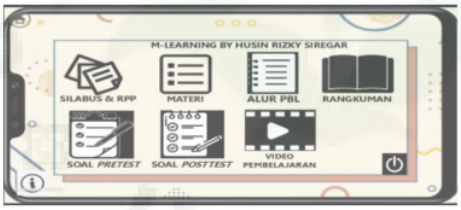

Fig. 2. Core Competencies (KI), Basic Competencies (KD), and RPP with PBL Flow

On the main menu page there is a material menu which if the material menu is selected, the display will change directly to the SOE, BUMS and Cooperative sub-materials. When the user selects the material, he can press "next" to go to the next page with the material for BUMN, BUMS and Cooperatives.

On the main menu page there is a PBL flow menu for students as M-Learning media collaboration with the PBL model. The page on the PBL flow will contain an issue on the discussion of BUMN, BUMS and Cooperatives. The students immediately formed groups so that they immediately looked for information about the problem. On the main menu page there is a Learning Video menu on BUMN, BUMS and Cooperative material. So when selected, it will display the contents of the entire video material and can continue to be reviewed by students.

On the main menu page there is a summary menu on the material for BUMN, BUMS and Cooperatives. So when selected, it will display the contents of the overall material summary and can continue to be reviewed by students. On the main menu page there are questions from BUMN, BUMS and Cooperative materials that can be tested on students and see learning outcomes with scores that appear directly on *the smartphone screen*. In this question, when the answer turns out to be wrong, the question will immediately move to the next number so that students do not press with 2 answers. This is designed so that students also do not copy their friends' answers because the answer choices move automatically.

Evaluation. At this stage, it is useful to find out how effective the *Mobile Learning product* that has been tested on 27 students of class XI IS with the material BUMN, BUMS and Cooperatives. The product was evaluated to find out how effective it can improve student learning outcomes in class XI IS SMA Negeri 2 Binjai. The technique to find out whether Android-based *Mobile Learning products* can improve student learning outcomes or not is done by giving *pretest questions* before using *Android* -based *Mobile Learning products*. After using the *Mobile Learning product* , students were given *posttest questions*. The *pretest value is* compared with the *posttest value* to get the results of the effectiveness of the Android-based *Mobile Learning product*.

Research discussion. In the product of learning media development, namely the Android-based *Learning Car with the Problem Based Learning* (PBL) flow, it is made with the *smart apps creator application* . The advantages of Android-based *Mobile Learning products*_with the PBL flow 1) the apk file can only be sent via *bluetooth* or *whatsapp* without having to download, 2) features made according to class XI students and making it easier for students to use *Mobile Learning,* 3) questions are made according to the material and can immediately see the direct value , 4) Make it easier for teachers to use technology in designing learning because smart apps creators are easy to get, 5) make learning media that can be used anytime and anywhere by students. This can be seen from the feasibility of the product from media, design and material experts. So that the trials on their students also saw firsthand the benefits of the product with the results of the product being 87.49% and the product effective at 84.69%. In the product of learning media development, namely the Android-based *Learning Car with the Problem Based Learning* (PBL) flow, it is made with the *smart apps creator application* . The advantages of Android-based *Mobile Learning products*_with the PBL flow 1) the apk file can only be sent via *bluetooth* or *whatsapp* without having to download, 2) features made according to class XI students and making it easier for students to use *Mobile Learning,* 3) questions are made according to the material and can immediately see the direct value , 4) Make it easier for teachers to use technology in designing learning because smart apps creators are easy to get, 5) make learning media that can be used anytime and anywhere by students. This can be seen from the feasibility of the product from media, design and material experts. So that the trials on their students also saw firsthand the benefits of the product with the results of the product being 87.49% and the product effective at 84.69%.

4 Conclusion

Based on the results of research and discussions that have been carried out, the following conclusions can be drawn:

Producing Android-based *Mobile Learning* with the PBL flow using the *smart apps creator application* which is indispensable in supporting the economic learning process with SOE,

BUMS and Cooperative materials can foster student learning enthusia and make it easier for teachers to deliver subject matter in *online* or *offline learning*. *The feasibility test of Android-based Mobile Learning* learning media with the PBL flow is said to be feasible with 88.74% produ results and 84.69% product effectiveness. Thus the product is said to be feasible to use to improve learning outcomes.

Mobile Learning with PBL flow is needed to improve student learning outcomes. This is supported by previous research with other applications. Fo *obile Learning* , the researchers themselves are said to be effective in improving student learning outcomes. It can be seen from the results of the comparison of *pretest* and *posttest scores* , ttable = 2,007 which is searched using table 0,05 and = 52, while tcount obtained is 2,337, then tcount > ttable = 2,337 > 2,007. The scores for the e rimental and control classes can be seen with 91.44 in the experime class. Based on these results, it can be concluded that there is learning effectiveness before and after using Android-based *Mobile Learning*.

Implica . This study shows that the learning process using the *Mobile Learning media* through the *Smart Apps Creator 3 application* is feasible to be used as a learning medium when *online* or *offline* because the Covid-19 pandemic is still not over. The *Smart Apps Creator 3 application* fulfills the learning needs of its co nt referring to the Competency Standards and Learning Objectives for economic subjects. This learning media is expected to be a solution to create innovation and the rapid development of *smartphone use* among school-age children and the development of technology that knows no age limit. This learning media is used for everyone who wants to learn about BUMN, BUMS and Cooperatives. With this learning media, it is hoped that similar learning media will appear related to economics for class XI students. This research and development is expected to be followed and developed into a better product by further research.

Suggestion. Based on the conclusions above, from this research some suggestions can be made as follows: If the learning resources are of high quality and able to attract the attention of students, then the learning can help students understand learning. Researchers suggest economics subject teachers to use applications that have been developed so that the material provided is more practical, easy, interesting and effective with a positive response from students.

With the development of learning media, currently many applications are made for *Mobile Learning* . It is recommended for further researchers to find more interactive innovations so that the development of learning media with technology is wider and can improve student learning outcomes.

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