



MISTIC (CHEMISTRY EDUCATION APPLICATION): INNOVATION OF PRACTICAL ANDROID BASED INSTRUCTIONAL MEDIA APPLICATION

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ABSTRACT

Based on the Circular Letter of Kemendikbud Dikti No. 1 of 2020 regarding the prevention of the spread of COVID-19 in Indonesia, all learning activities are turned into online learning. This sudden change caused several new problems in the world of education such as students not being able to learn independently and actively participate optimally, difficulty in having internet data, unsupported signals, and for teachers the difficulty of correcting students' assignments and exercises and not carrying out practicals, while online. One way to solve this problem is to create an Android-based learning media application. This product is a technology that utilizes smartphones with the android platform. This product can be developed to meet the needs of teachers and students when learning online. This product is equipped with a virtual lab and exercises to strengthen students' concepts, students can fill out exercises directly on the product and get feedback from the answers given. Besides, this product is equipped with evaluation questions that can detect the accuracy and speed of students in answering questions. Every time you finish answering questions, the grades and rankings of students in the class are automatically displayed on the student's android screen. This makes students motivated and eager to do evaluations because of the desire to get a higher rank, and is expected to improve student learning outcomes. This product was developed on the fundamental chemical laws topic. This product was developed through Kodular and in collaboration with the Google Forms and Quizizz websites. Kodular is an application developer using block programming. The resulting product has a capacity of 35 MB and is also connected to other sites on the internet. In this product there are menus in the form of competencies, instructions for use, attendance lists, materials, evaluations, developer profiles, feedback, and references.

Keywords: Instructional media; Application; Android; Fundamental Chemical Laws; Practical

1. INTRODUCTION

Currently the quality of education is experiencing challenges from the impact of the outbreak of the Corona Virus Disease 2019 (Covid-19). Therefore, a circular letter number: 36962/MPK.A/HK/2020 was issued as an effort to deal with Covid-19, especially in the world of education from the Minister of Education and Culture of the Republic of Indonesia. Regarding the appeal on March 17, 2020 as a prevention of the spread of Covid-19, namely regarding the implementation of the online learning process (on the network) and doing work from home [1]. This appeal was made to reduce physical interaction as an effort to prevent the spread of Covid-19. Then the Ministry of Education and Culture reissued a letter regarding the implementation of education policies in the emergency period of the spread of Covid-19, namely circular letter number 4 of 2020 (Ministry of Education and Culture, 2020).

Changes in conditions in the world of education that occur suddenly should not interfere with the learning process. Therefore, it is necessary to make a breakthrough so that the learning process can continue well and optimally as an effort during the pandemic. Distance Learning (PJJ) or the virtual learning process is an alternative that is currently being carried out as a solution in adjusting to situations and conditions. Besides that, learning media is also needed that is suitable for these situations and conditions [2]. During this pandemic period, the selection of the right learning media has the aim of obtaining good results and in accordance with existing conditions and needs.

One of the chemistry materials for class X students is the material on the basic laws of chemistry. This material includes Lavoisier's law (law of conservation of mass), Proust's law (law of constant proportions), Dalton's law (law of multiples of comparison), Gay-Lussac's law (law of volume ratio) and Avogadro's hypothesis. In the material of the basic laws of chemistry there are basic concepts. These basic concepts must be understood by students before exploring other concepts in chemistry such as thermochemistry, chemical equilibrium, and reaction rates [3]. So that students must understand the material of these basic laws in order to assist in learning the next material. Meanwhile, Mardani et al., (2020) stated that in the chemistry subject the basic law material of chemistry is included in the category of difficult material. Therefore, to assist in understanding this material for students, one thing that must be considered is the selection of the right learning media.

From the results of the questionnaire distributed to teachers and students of class XI at SMAN 1 Padang, SMA Adabiah 2 Padang, SMAN 7 Padang, and SMAN 16 Padang which is attached in Appendix 3, it shows that teachers from these four schools in the basic law material of chemistry have used the media. and teaching materials include printed books, LKPD, printed modules, e-modules, PPT, and learning videos. The media and teaching materials are used at the stage of concept discovery and concept consolidation. However, the use of these media and teaching materials has not been able to make students independent in learning during online learning. In addition, teachers also use applications/sites in online learning such as WhatsApp, Google Classroom and Zoom meet [5]. However, the use of these applications/sites during online learning has not been able to cause students to actively participate during learning. This of course cannot be separated from the obstacles faced by students during learning. Some of the obstacles that students experience during online learning are difficulty in having internet data, unsupported signals [6], not being able to go online at the specified time, difficulty accessing the application/site used and difficult to understand the subject matter [7]. In addition, the teacher also experienced problems when correcting assignments and training/evaluating students during online learning on the material chemistry is the basic laws of chemistry. So the need for learning media for students and teachers who can overcome the problems experienced.

Based on the results of the questionnaire given to students in the four schools, it was found that the electronic devices and applications/sites used during online learning did not attract students'

interest when studying. The results of the questionnaire show that students like media/teaching materials with characteristics such as having audio and video, can be used for practice questions (concept consolidation) [8], can be used to measure mastery of the material for students, can be used anytime and anywhere [9], and can be used whether it is connected to the internet or not [10]. So the need for learning media that matches the characteristics favored by students and is expected to be able to attract students' interest when learning [11].

During online learning, students and teachers in the teaching and learning process use electronic media, especially Android [12]. From the questionnaire distributed to students, the estimated duration of android use used in a day varies, including for less than five hours, five to ten hours and more than ten hours with the percentages being 19.17%, 29.17%, respectively. and 51.67%. However, from that time, less than 25% was used for learning. This was stated by 67.50% of students who filled out the questionnaire. Then, from the questionnaire distributed to teachers in four schools, only one of the six teachers was aware of the existence of an Android-based mobile learning application as a learning medium and used it in the material of the basic laws of chemistry. Even though the use of Android can affect students during the learning process. This is as stated by [13] in their research that the existence of android-based learning media is able to affect cognitive learning outcomes in improving academic performance and also affects the form of high school students' learning motivation.

Android-based mobile learning applications as learning media have been carried out by previous researchers. Husna & Zainul, (2019) and Ulfa & Lukman (2020) found that the use of android-based media during learning can provide an increase for students in the achievement of cognitive learning outcomes. Then El-Sofany & El-Haggar (2020), Rayhanny & Zainul (2017) and Pedro et al. (2018) revealed that the use of developed mobile learning applications has an effect on improving students' academic performance. In addition, Widodo et al., (2020) found that the use of developed android-based media can foster students' scientific literacy.

2. LITERATURE REVIEW

2.1 Android-Based Mobile Learning Application

Android-based mobile learning application is a technology that can be used as a medium of learning in the world of education that utilizes smartphones with the android platform [20]. This application can be developed in such a way as to meet the needs of teachers and the characteristics of students when learning [21].

2.2 Mobile Learning Application

The mobile learning application that will be developed is expected to be able to cause students to be active and independent in learning, especially during online learning [22]. because in this application features are available in the form of material, practice questions,

discussion of questions, along with learning videos that can be accessed online [23]. independently by students. In addition, this application should be able to overcome the obstacles that students experience during online learning such as difficulty in having internet data, unsupported signals, not being able to go online at the specified time, difficulty accessing the application/site used and difficult to understand the material being studied. because this application can be used without an internet connection so that students can access it anytime and anywhere, except in working on questions and accessing this learning video requires an internet connection.

The mobile learning application that will be developed is expected to be able to attract the interest of students while studying [24]. Its because this application is developed according to the characteristics of the media/teaching materials preferred by students, namely having audio and video [6]. can be used for practice questions (concept stabilization), can be used for measuring the mastery of the material to students, can be used anytime and anywhere, and can be used in a state connected to the internet network or not. In addition, this application is expected to make it easier for teachers to correct assignments [25] and practice/evaluate students when online learning on the basic laws of chemistry material because after completing assignments and exercises/evaluations by students via Android [26], then the teacher can access students' answers via android along with the value of these students [27].

3. EXPERIMENTAL

This research is included in the research and development category or also known as R&D (Research and Development). R&D is a research method that has the goal of producing a product and then testing whether or not the product is effective [28]. This research was conducted to produce an Android-based mobile learning application as a learning medium for the material of the basic laws of chemistry for class X SMA/MA. Researchers determine the development model to be applied, namely the plomp development model. Plomp has three stages including preliminary research, development or prototyping phase and assessment phase [29]. Researchers limit the research to be carried out to the development or prototyping phase [30].

The steps in the development or prototyping phase are (1) collecting sources, materials or references needed in designing an Android-based mobile learning application on the basic laws of chemistry and determining the components or features that will be included in the learning media application. , (2) create an android-based mobile learning application on kodular that can be accessed via google with web creator.kodular.io, (3) create a form from the google form website and make evaluation questions on the quizizz website which will later be collaborated with the android application which

was made in kodular, (4) collaborated on forms from the google form website and evaluation questions on the quizizz website that had been made with an android application made in kodular, (5) exported applications that had been made in kodular in android app format (. apk) and proceed with downloading the apk, (6) moving the file with the apk format to android and doing it n installation of applications that have been made.

4. RESULTS AND DISCUSSION

This research resulted in the design of an Android-based learning media application on the material of the basic laws of chemistry for class X SMA/MA. Further testing will be carried out on products that have been designed at the assessment phase according to the plomp stage including validity, practicality and effectiveness.

5. CONCLUSION

Android-based learning media applications on the material of basic laws of chemistry class X SMA/MA can be designed using the Plomp model.

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