Mock Up Based on Android Through Multimedia Development Live Cycle : Science Meaningfull Learning

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A R T I C L E   I N F O

A B S T R A K

Covid 19 telah memunculkan losslearning dan penurunan motivasi siswa dalam belajar sehingga dibutuhkan pembelajaran yang mampu meningkatkan motivasi dan kebermaknaan dalam belajar. Tujuan penelitian ini adalah mengembangkan mock up berbasis android menggunakan langkah Multimedia Development Live Cycle (MDLC) untuk mengembangkan pembelajaran IPA di SD yang bermakna. Penelitian ini merupakan penelitian pengembangan menggunakan tahapan MDLC yang dilanjutkan dengan uji coba kepada ahli materi, bahasa, media dan pengguna. Subyek penelitian ini adalah ahli, guru dan siswa. Teknis analisis yang digunakan teknik deskriptif kuantitatif. Metode pengumpulan data terdiri dari angket, wawancara dan tes. Instrumen berupa lembar validasi ahli, tes, wawancara dan angket respon guru dan siswa. Hasil penelitian menunjukkan bahwa media yang telah dikembangkan mendapatkan kelayakan ahli materi 68% (layak), ahli media 91% (sangat layak), dan bahasa sebesar 94% (layak). Penilaian kepraktisan guru memperoleh persentase 87% (sangat praktis) dan siswa memperoleh proporsi 77% dengan kriteria sangat praktis. Mock up berbasis android layak digunakan. Hal ini juga didasarkan dari hasil peningkatan rata-rata nilai pretest sebesar 63,3 dan posttest sebesar 77,7. Nilai postes juga menunjukkan nilai diatas Kriteria Ketuntasan Minimal (KKM). Mock Up berbasis android dapat meningkatkan hasil belajar siswa serta menjadikan pembelajaran IPA lebih bermakna bagi siswa.

A B S T R A C T

Covid 19 has led to loss learning and decreased student motivation in learning so that learning is needed that can increase motivation and meaningfulness in learning. The purpose of this study was to develop an Android-based mock up using the Multimedia Development Live Cycle (MDLC) steps to develop meaningful science learning in elementary schools. This research is a development research using the MDLC stages followed by trials on material, language, media and user experts. The subjects of this study were experts, teachers and 5th grade students. Technical analysis used descriptive quantitative techniques. Data collection methods consist of questionnaires, interviews and tests. Instruments in the form of expert validation sheets, tests, interviews and teacher and student response questionnaires. The results of the study show that the media that has been developed has a material expert feasibility of 68% (appropriate), media expert 91% (very feasible), and language expert 94% (decent). The teacher's practicality assessment obtained a percentage of 87% (very practical) and students obtained a proportion of 77% with very practical criteria. Android-based mock up is feasible to use. This is also based on the results of an increase in the average pretest score of 63.3 and posttest of 77.7. Posttest scores also show scores above the Minimum Completeness Criteria (KKM). Android-based Mock Up can improve student learning outcomes and make science learning more meaningful for students.

1. INTRODUCTION

The pandemic Covid 19 Virus has such a huge impact on all countries including Indonesia in all aspects of life. In the world of education there has been a widespread interruption of face-to-face learning activities both at school. In the world of education, loss learning occurs where students lose knowledge and skills in academic development due to a pandemic (Cerelia et al., 2021; Muthmainnah & Rohmah, 2022; Solihat et al., 2022; Widyasari et al., 2022). During a pandemic, learning refers more to online learning. Online learning is a learning that requires an internet network with accessibility, connectivity, flexibility, and the ability to create types of learning interactions (Firman & Rahman, 2020; Latifa et al., 2021). The use of the internet and multimedia technology can change the way knowledge is delivered and can also be an alternative to learning that is carried out in the classroom as usual. Learning which is carried out face-to-face is replaced by face-to-face via

mobile phones or laptops and computer (Firman & Rahman, 2020; Rapanta et al., 2020). This learning requires adequate facilities and infrastructure, such as laptops, computers, smartphones and internet networks which aim to access learning materials, interact with materials; teachers, get learning support (Handarini, Oktafia & Wulandari, 2020; Satyawan et al., 2021). The purpose of online learning is to acquire knowledge, create understanding and to develop from learning experiences, train independent learning and motivate students to be more active by utilizing increasingly sophisticated and complex technology, the role of the teacher remains active as a facilitator, and the need for technology such as adequate hardware and software for the continuity and effectiveness of this online learning (Diva et al., 2021; Firman & Rahman, 2020; Handarini, Oktafia & Wulandari, 2020; Sudarsana, 2020; Sadikin & Hamidah, 2020).

During online learning, several problems occurred including the lack of facilities that can support online learning (Rosnaeni & Prastowo, 2021), students who are less active in learning and students experience boredom (Prawanti & Sumarni, 2020), not enthusiastic (Emmy Natsir & Jamila, 2021), lack of student commitment (Warsito et al., 2022), decreased student responsibility ((Dewi et al., 2022; Fatmawati, 2021), Difficulty of students operating the device (Fajrin & Wulandari, 2021; Prawanti & Sumarni, 2020; Rigianti, 2020; Widyasari et al., 2022). This happened in several elementary schools. Several elementary schools stated that learning activities carried out online resulted in students being less enthusiastic in learning, learning media were less able to help carry out learning during the pandemic and after the pandemic. As a result, many students experience obstacles in the form of loss learning, low student motivation and decreased student concentration abilities.

Learning problems occur in all learning, one of which is science learning. Science learning during covid 19 learning experienced a crucial problem where learning was only centered on one learning resource and did not practice the characteristics of science learning. The characteristics of science learning emphasize the process of discovery about nature and natural objects and natural phenomena (Fathina et al., 2016; Widani et al., 2019), and direct experience (Irianto et al., 2015; Pratiwi et al., 2019; Prayogi et al., 2021) and improves the quality of the learning process so that learning becomes meaningful (Primayana et al., 2019), improve thinking habits (Panggabean et al., 2021), active and curious (Sofyana & Rozaq, 2019).

Based on this statement, teachers need to design interesting learning for students, especially after online learning due to covid 19. Teachers are required to be able to design learning according to current conditions and can facilitate student learning by creating creative (Latifa et al., 2021; Mansur et al., 2021; Mishra et al., 2020). Learning must be designed together during the learning process to provide space for students to learn and explore the material to be studied independently. It is necessary to design and learning media that develop student learning activities so that learning is meaningful for students (Saputra et al., 2021; Ying et al., 2021). Meaningful learning is needed to overcome loss learning that occurs due to the COVID-19 pandemic.

Meaningful learning emphasizes students' acquisition of new information and its relationship to experience (Lee & Martin, 2017; Sailin & Mahmor, 2016), and prior knowledge in the formation of personal understanding (Huang & Chiu, 2015). Meaningful learning allows students to interpret knowledge to become creative citizens and think critically where students play an active role through the process itself (metacognition) (Cedere et al., 2020). The characteristics of meaningful learning include active, authentic, constructive and cooperative (Huang et al., 2011; Indrianto & Kurniawati, 2020), focusing on contextualization of learning, relevant, problem-based, promoting attitudes and skills that emphasize learning responsibility(Angela, 2014).

One way that can be used to develop meaningful learning is through innovative learning by integrating learning technology (Rohayati et al., 2021; Sailin & Mahmor, 2016), for example by developing learning media which makes learning easier for students to understand. and learning is more interesting due to online learning (Muthmainnah & Rohmah, 2022; Sanjaya et al., 2021; Wulandari et al., 2020). The amount of material that must be understood makes students sometimes feel bored. The use of media here is needed to increase the enthusiasm of students to keep following learning. Learning media serves to stimulate learning by: (1) presenting the actual object and the step object. (2) create a duplication of the actual object. (3) loading abstract concepts into concrete concepts. (4) gives a common perception. (5) overcome the barriers of time, place, number and distance. (6) presenting information consistently. (7) provide a pleasant learning atmosphere, not pressured, relaxed and interesting, so as to achieve learning objectives (Mustaqim, 2016). Media can help convey student learning information through concrete objects (Nurmaulidina & Bhakti, 2020; Wulandari et al., 2020). The use of media in the learning process is very important for teachers to do to students because it can help students to better understand the material presented by the teacher.

Media that can be used is Mock up learning media (Nurlaila et al., 2016b; Ramadani & Novrita, 2019). Mock-up media is a three-dimensional imitation media. Mock-up is a three-dimensional media model which is an imitation of a real object, such as a large object, a distant object, an object that is too expensive, an object that is too small, or an object that is not possible to use in classroom learning such as the rain cycle, life cycle of marine animals or and so on . Mock-Up is an artificial media that depicts motion, sound, process or light on an object. Mock-Up is a form of simplifying the basic structure of a more complicated process or system (Maulidiya & Nurlaelah, 2019; Meilinda et al., 2017).

Mock-up media is a media that resembles the original object, this media can make it easier for teachers to explain the material and make it easier for students to understand and remember the material being taught by practicing directly the material being taught. Mock ups are imitations of actual objects where the important parts that are needed are deliberately chosen to be made as simple as possible so that they are easy to learn (Meilinda et al., 2017; Ramadani & Novrita, 2019). Media serves to clarify the complexity of teaching materials. Media will not produce an efficient learning process if its use is not in line with its function, good media is an effective media.

Mock-ups make wider, clearer, more concrete experience, insight and knowledge, as a learning support (Farida Nur Kumala et al., 2020), affect student learning outcome (Fitriana, 2020; Maharputrananda et al., 2020; Maulidiya & Nurlaelah, 2019), learning aids (F.N. Kumala et al., 2019) and increasing students' enthusiasm (Dwi agus setiawan & Nur Kumala, 2020) and learning motivation (F.N. Kumala et al., 2021). It is important for students to have learning motivation because learning motivation can develop more enthusiasm for learning and develop students' positive attitudes in learning (F.N. Kumala et al., 2019). The selection of mock-up media is seen as being able to assist teachers in delivering abstract learning materials to be more concrete, in addition to using mock-up media students will learn more meaningfully because they can directly find the learning concepts they are learning (Nurlaila et al., 2016a).

Mock-up media is usually used in learning which is still in the form of two-dimensional media or dioramas. Currently, all learning leads to android-based learning. In this study, an Android-based media was developed which is different from the previous one, in which it contains material for the fifth grade ecosystem, mock-up-based online learning media can be used independently without a teacher. The android-based mock-up in this study contains material that is supported by music or video. Mock Up media is expected to be useful for students and increase enthusiasm and interest in learning. Based on the background that has been described previously, the purpose of this research is to develop an android-based mockup learning media in science learning.

2. METHOD

This research is a Research and Development (R&D) research. This study aims to develop mock up based learning media for fifth grade students of SD Negeri 3 Gajahrejo for 45 students. This media was developed from three-dimensional media into an android-based application media. The development model used is MDLC model which consists of conceptualizing, designing, material collecting, assembly, testing, and distribution (Kumala et al., 2021). The models is shown in Figure 1.
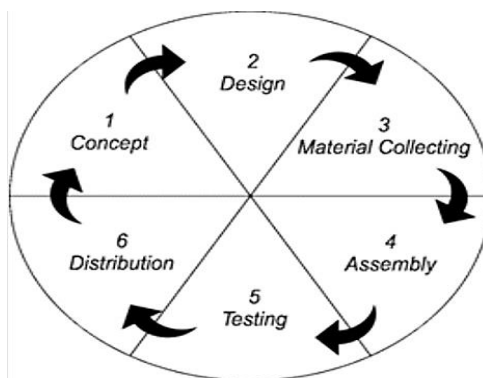

Figure 1. Steps of MDLC

Based on Figure 1, it is known that there are six main steps in MDLC. In this research, modifications were made to the distribution step by testing the feasibility, practicality and effectiveness of the product. The description of the MDLC steps starts from the initial stage, namely the concept. This stage is the determine the goals and benefits stage, user subjects and determine the concept design to be developed. In this study, an analysis of media development needs was also carried out. Based on the results of the needs analysis, it is necessary to develop a media mockup to increase the learning motivation of elementary school students in learning science after the covid 19 pandemic. The second stage is design, this stage is the stage of doing the design is done with the stages of designing the material (analysis of the depth and breadth of the material to be developed), designing learning activities using media, designing navigation structures, designing storyboards. The third stage is the material collecting stage which consists of collecting materials in accordance with the design of the media set, such as images, photos, animations, audio and video.

The fourth stage is assembly, this stage is the stage of making all objects or multimedia materials. Application creation is based on the design stage, such as storyboards and navigation structures. Followed by the fifth stage, namely testing, the testing phase is carried out after the assembly phase is complete. The testing phase can be done by running the completed program to ensure whether the results are as desired and there are no errors (errors). The testing phase used is Blackbox Testing. Blackbox Testing is a system test without regard to the software's internal logical structure. Blackbox Testing tries various inputs and checks the resulting output. The testing phase (testing) carried out will go through the sequence: test scenarios, test results and test conclusions. And the last stage is distribution, this stage can also be called the evaluation stage for the development of finished products to make them better. The results of this evaluation can be used as input for the concept stage of the next product. After the MDLC development stage was carried out, the product was tested for experts, practitioners (teachers) and students. Experts in this study consist of media, language and content experts. Media experts are lecturers in the field of learning media in elementary schools, material experts are lecturers in science in elementary schools and language experts are lecturers in Indonesian language in elementary schools. a The trial was carried out using the test instrument shown in table 1.

Table 1. Questionnaire instrument for Experts

Aspect	Indicator.	Respondent
Content	Content scope Content accuracy Recency Compliance with regulations	Material expert are lecture in science in elementary school and teacher
Language	Suitability with student character Communicative Dialogic and Interactive Straightforward Coherrence Suitability with Indonesian language standart Consystensy of symbol	language experts are lecturers in Indonesian language in elementary schools and teacher
Medium	Conformity of goal learning Feed back and Adaptation Motivation Design Usability Acessability Compilance with standart	Media experts are lecturers in the field of learning media in elementary schools and teacher

(Badan Standar Nasional Pendidikan, 2014)

Before being used, the measurement instrument validation is carried out for experts and practitioners to learning evaluation experts in this case are experts in the field of research instruments (V1), lecturers of research methodology (V2) and teachers. Based on the results of instrument validation that have been carried out, the results of the instrument measurement instrument validation are shown in table 2.

Table 2. Instrument Validation Results

Indicator	Sub Indicator	V1	V2	Teacher
Display	Clarity of instructions for using the instrument	4	3	4
	Clarity of questions	3	3	4
	Easy-to-follow question flow	3	4	4
	Reasonable time needed to work on questions	3	4	4
	Clarity of understanding on each item	3	3	4
	Appropriateness of the format used	3	4	3
	Appropriate writing size used	4	4	4
Language	Clarity of sentences in items	4	3	3
	The suitability of the language used with the user	3	4	3
	Clarity of language used in item	4	4	4
	Clarity of writing formats, symbols and images	4	4	4
Content	The suitability of indicators with the objectives of instrument development	4	4	4

Indicator	Sub Indicator	V1	V2	Teacher
	the suitability of indicators with concepts or theories	4	4	4
	the suitability of the indicator with the item	3	4	3
	The truth of the substance of the item	4	4	4
	Measurement scale suitability	3	4	3
Average		**3,5**	**3,75**	**3,68**

Based on the average results from the instrument validator and teacher, it is known that the instrument validation results show a value of 3.64 or equivalent to 91% so that it is declared feasible, but there are several revisions related to the writing structure and clarity of the introductory sentence on the instrument. The results of the next revision were used to collect research data. The data analysis technique in this study uses quantitative data analysis techniques where the data in the form of calculation results are added up and then compared to get a feasibility percentage. The results of the data analysis were then tested for product effectiveness by increasing the average pretest and posttest results.

3. RESULT AND DISCUSSION

Result

The results of the research based on the MDLC steps include analyzing the objectives, benefits and needs of learning media development. It was obtained data that the implementation of learning in research subjects still did not utilize the media in learning, although there were several learning media used but in utilizing them they were still less efficient and effective. Effective and efficient media is needed to overcome this, one of which is by developing mock up learning media.

The second stage is the design of instructional media desinilaign of instructional media by 1) analyzing the depth and breadth of the material. The material analyzed is the ecosystem material in science learning in elementary school. The material on the ecosystem is described on a concept map which consists of material on the relationship between living things, components of the ecosystem of living things, food webs, types of ecosystems, symbiosis and animal classification. The material is divided into learning concepts, examples and analogies to the material. Furthermore, the design of learning activities on mock up based android media is carried out, the activities to be developed consist of media design, application design, image and video design that will be included as well as evaluations and quizzes. The results of the design developed a story board in Figure 2.
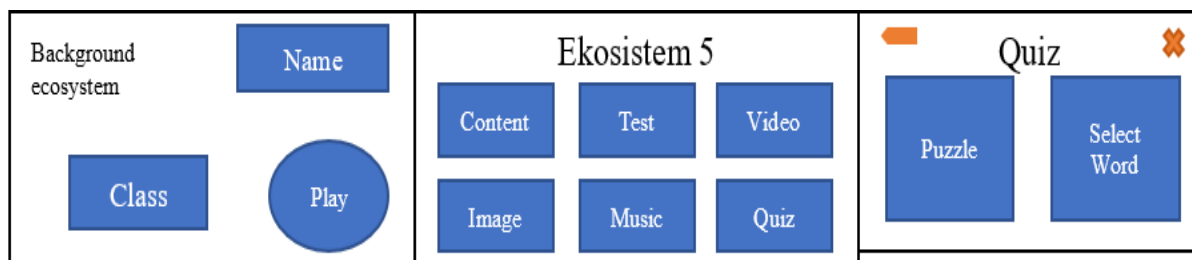

Figure 2. The Results of The Design Developed a Story Board

The third stage is collecting materials. The materials collected are materials and concepts related to ecosystems, photos and videos that support ecosystem materials. After the material is collected, then assembly is carried out, at this stage all objects and materials that have been collected are assembled based on the storyboard design and navigation structure. The display mock uop media based on android in Figure 3.
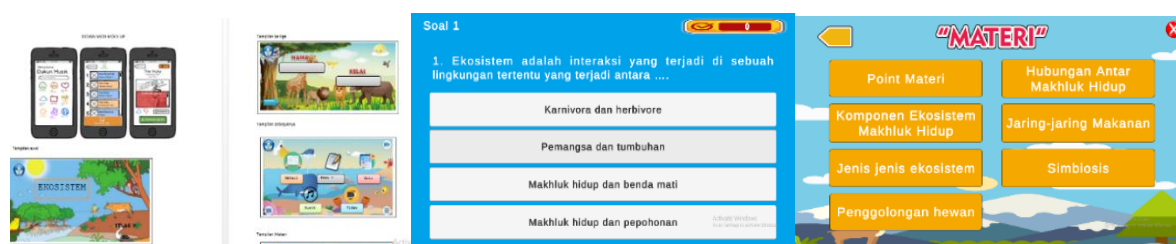

Figure 3. Development of Mock Up Media

The media that has been developed is then tested for testing the media that has been developed. Testing is done by testing the system without paying attention to the internal logical structure of the software. Blackbox Testing tries various inputs and checks the resulting output. The results of the testing show that the media that has been developed has been able to work well. The test results are then distributed to experts, teachers and students based on aspects of language, media, and material. The results of the experts in figure 4.
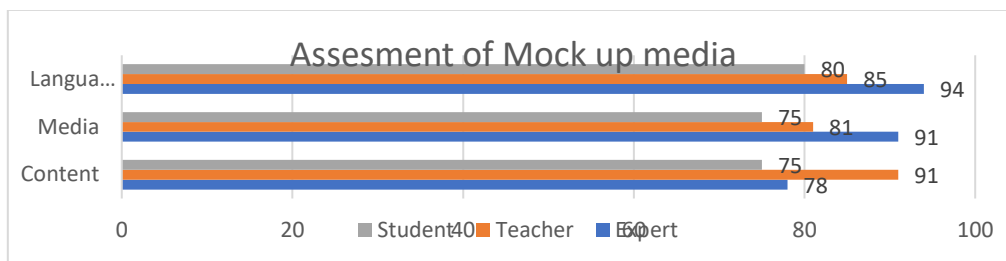

Figure 4. Assesment of Mock Up Media

Based on figures 3, the average overall score is above 75% so that it is included in the valid and practical category. The results of student responses indicate that the media is very helpful in the learning process. Based on the results of the response, the effectiveness test for elementary science learning was carried out using android-based mock up media. The implementation of learning using android-based mock up media increases student learning activities. Students learn independently using the instructions contained in the media in groups to discuss the material, assignments and quizzes that are on the media. Students seem to enjoy the existing learning process and are motivated as indicated by student learning activities that are more enthusiastic in learning. This is shown from the results of interviews with teachers and several students. The fifth grade teacher explained that this android-based mock up media increased student learning activities and also the enthusiasm of students to learn. *This is an alternative to overcome learning problems after the pandemic. The learning increase the student activities and motivation. I think the learning becomes more meaning full.* In addition to the teacher, interviews were also conducted with several students including A.R. Students who stated that *I felt happy and excited about the media used by the teacher, because the media used were interesting and had many activities. I can discuss to do assignments on evaluations and quizzes on the media.* Interviews were also conducted with D.F students who stated that while using the mock up based android media, they felt that learning was fun. The following are the results of interviews with D.F students. *The media used by the teacher is very interesting, I don't feel like studying as usual, but I feel like play and learn a lot. I better understand the material presented.*

Furthermore, based on the learning that has been done tests to test the effectiveness of the implementation of learning using the t test using the hypothesis that has been developed. Prior to the t-test, the classical assumption test was performed. The results of the classical assumption test are valid and reliable so that a t-test can be performed. In this study, the paired t test was used. Paired t test results are shown in the table 3.

Tabel 3. Learning Outcome Using Android-Based Mock Up Learning Media

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	63.3111	45	8.91327	1.32871
Postest	77.6444	45	6.67817	.99552

Based on table 3 it is known that the average student learning outcomes is 63.3 for students' pretest and 77.6 for posttest of 45 students who take part in learning using mockup learning media based on Android. With a standard deviation of 8.9 at the pretest and 6.67 at the posttest. The standard deviation shows the diversity of existing values. Based on the data obtained, the diversity of pre-test and post-test data shows greater diversity during the pre-test compared to the post-test. Likewise with the average standard error of 1.32 during the pre-test so that it can be described that the average pre-test ranges from 63.3 ± 1.32 and the post-test value is 0.99 so that it can be described as 77.6 ± 0.99. Besides that, based on learning outcomes it is known to get a value of 77, which means that it has reached above the minimum completeness criteria (KKM). Based on this, it can be seen that there is an increase in student learning outcomes before using and after using mockup learning media. It can be concluded that Android-based multimedia is effective in improving student learning outcomes.

Discussion

Based on the results of the research that has been done, it is known that the android-based mock up media has been tested according to the testing stages in the MDLC step. The MDLC stages are suitable for use in

developing learning media (Mustika et al., 2018; Purwanti et al., 2022). It is because in MDLC there are several stages that can improve product quality. Some of the stages are the concept stage, learning media trials and distribution of programs that will be developed before being used by users. Concept stages to determine program goals and users (Mustika, 2018; Mustika et al., 2018; Prayogha & Pratama, 2020). In this research, this stage is also carried out through needs analysis. Needs analysis is very important to do to determine the characteristics of the program used according to user needs so that the media used can be used properly. There are four basic issues regarding problem definition, namely: a. identify clients/sponsors/target audiences b. bring out their needs/wants c. identify the scope of the project d. understand the limitations of existing resources Problem definition can be reached and concluded when one understands the target user, technology, and problem area. This is important for the development of multimedia as well as other systems, to identify the strengths and weaknesses of developers and seek help from people who are more experienced in areas that are not mastered (Binanto, 2013; Kurniawan et al., 2019).

At the design stage it is used to determine the quality of the product and the design of the resulting product before compiling the product. at this stage also make specifications and visualizations of the program architecture, style, appearance and material requirements or materials for the program. This stage is also used as a reference in compiling the program, while at the product testing stage, product or media performance trials are carried out before being used and distributed (Laksana et al., 2019; Mustika et al., 2018; Septiani et al., 2020). At this stage, design testing is carried out. Using a bad design will multiply major problems during production and will go back to the previous design stage to fix them. (Binanto, 2013; Syahrowardi & Permana, 2016). Product performance testing can reduce system failures on the product and fix errors when the system is run before distribution. It takes detailed testing before the product is finished perfectly (Binanto, 2013; Wulandari et al., 2017). Next is the trial phase for users, namely experts, teachers and students. This stage makes the media that has been developed feasible from various stages and points of view. Several responses from experts and practitioners were used as suggestions to complement each other and make the product more perfect for use in the learning process. Based on this, it can be seen that the MDLC model is suitable to be used to develop learning media because the MDLC model is easy to understand and implement, the stages are clear and easy to follow, structured and logically sequenced, can be used by small developers (Binanto, 2013).

In addition, the results of interviews and observations showed that students were more enthusiastic and motivated in carrying out learning because activities on android-based mock up media made students have more activities, where students had to design and carry out learning independently. Independent student learning activities will lead to student independence in learning where students become co-learners and co-designers in learning (Tinedi et al., 2018; Tse et al., 2013). Activities like this will be able to make learning more meaningful for students which in the end are able to maintain retention of learning understanding, self-confidence and improve student achievement (Huang & Chiu, 2015). Meaningful learning emphasizes the acquisition of students' new information and its relationship to experience and prior knowledge in the formation of personal understanding (Huang et al., 2011; Sailin & Mahmor, 2016). Meaningful learning allows students to interpret knowledge to become creative citizens and think critically where students play an active role through the process itself (metacognition) (Cedere et al., 2020; Huang et al., 2011). Meaningful learning is very much needed in the current era, especially after the COVID-19 pandemic which causes loss learning. Some of the loss learning that occurs include students not paying attention to learning, students' understanding that is not deep, decreasing student enthusiasm and motivation, decreasing discipline, social and communication skills (Farida Nur Kumala et al., 2022; Rohayati et al., 2021). One of the causes of loss learning is learning that is one-way without any interaction between teachers and students. The teacher only gives assignments but lacks explanations, the media used is still not optimal as well as internet accessibility and students' economic conditions (Cerelia et al., 2021; Fajrin & Wulandari, 2021).

f it is seen from the learning outcomes, it is known that there is a significant increase in learning outcomes and the calculation results show that the alternative hypothesis is accepted, which means that there is a difference between before and after learning using androdid-based learning is carried out. The increase in learning outcomes and practicality of learning is due to learning using interesting and interactive learning media in learning (Hamer & Rohimajaya, 2018; Suryani et al., 2020; Ying et al., 2021). Learning media is very helpful in improving students' understanding in learning. Learning media is an important component in planning, implementing and evaluating learning. Learning media is a communication tool that supports the learning process, making it easier for educators to convey messages or information to students (Senen et al., 2021; Wardoyo & Article, 2016). Learning media serves to (1) present the actual object and the step object. (2) create a duplication of the actual object. (3) loading abstract concepts into concrete concepts. (4) gives the same perception. (5) overcome the barriers of time, place, number and distance. (6) presenting information consistently. (7) provide a pleasant learning atmosphere, not pressured, relaxed and interesting, so that learning objectives are achieved (Azhar, 2011). Media serves to clarify learning and produce an efficient and effective learning process (Freddy et al., 2019; Lusiana & Maryanti, 2020). Media can form concepts and improve

material understanding (Ariesta, 2018; Prayogi et al., 2021; Suharsiwi, S., Fadilah, N., & Farokhah, 2022), increase motivation, and think critically (Jamil, S.H., & Apriliasanda, 2020). Interactive learning will generate motivation and stimulation of student learning activities, help students students improve understanding of learning materials and grow creativity in learning so that it will have an impact on improving the quality of learning. This multimedia-based interactive learning media also helps teachers in process of teaching students (Sugiarto, 2018).

Mock ups are media that resemble real objects to make it easier for teachers to explain the material and make it easier for students to understand the material and improve student learning outcomes. Mock-up media is an imitation that describes motion, sound, processes on an object and is a simplification of the basic structure of a more complicated process or system (Maulidiya & Nurlaelah, 2019; Nurlaila et al., 2016b). Mockups are imitations of real objects where the very important parts needed are deliberately chosen to be made as simple as possible so that they are easy to learn. Mock-ups can add a clearer and more concrete learning experience (Nurlaila et al., 2016a) so that learning can take place more effectively. Mock ups can be used as learning support, visualization of learning concepts (Razali et al., 2020; Schreyer, 2014) and can affect student learning outcomes (Maharputrananda et al., 2020; Maulidiya & Nurlaelah, 2019), student learning understanding (Syahbrudin, 2018) and student learning activities. The increase in student learning outcomes is due to the use of learning media to increase student interest in learning (Yuliansih et al., 2021), improve thinking skills (Chasanah et al., 2019) and learning motivation (Febrita & Ulfah, 2019; Prayogi et al., 2021; Risabethe & Astuti, 2017; Yuliani H & Winata, 2017). It is important for students to have learning motivation because learning motivation can further foster the spirit of learning and develop students' positive attitudes in learning (F.N. Kumala et al., 2019). In this study, the mock-up used was an android-based mock-up that made it easier for students to study independently wherever and whenever. This is the advantage of the mock up that has been developed. Several studies and publications related to the development of mock ups have been carried out including (Hasanah et al., 2020; Masithoh et al., 2022; Nurlaila et al., 2016a; Santoso, 2018; Sari, 2019), developed a three-dimensional mock-up, while (Sumayana et al., 2021) developed a book mock-up and developed a card mock-up (Derosma et al., 2022).

Based on previous research that has been done, it is known that, in this study, it tries to give a touch of technology to the existing mock ups. The existing mock ups are mock ups that are still in the form of hardfiles, when compared to mock ups that have been developed based on android, they can be used more practically, can be used anytime and anywhere as needed. In addition, the mock ups developed can reduce the problem of student dependence on gadgets which is getting bigger day by day. In students' mindsets, Android-based learning is considered more attractive because some game features and attractive displays make students more motivated in learning so that learning outcomes can increase (Andriani & Suratman, 2021; Cholid & Ambarwati, 2021; Lubis & Ikhsan, 2015; Saputri, 2016) and student learning achievement (Lubis & Ikhsan, 2015; Saputri, 2016; Wahid et al., 2020). Students will feel playing while learning to use android. The implications of this research are expected in the teacher's learning process using learning media that can improve students' understanding and motivation in learning (Elsayed & Al-Najrani, 2021; Ulfaida & Pahlevi, 2021). Learning will become more concrete and interesting which in turn can improve student learning outcomes (Kolopita et al., 2022; Nurwidayanti & Mukminan, 2018; Roshonah & Dwitami, 2021).

4. CONCLUSION

Based on the research results, it is known that Mock-up-based android media is properly used in learning because the media that has been developed is feasible, practical and effective. These results are based on the results of due diligence by material, media and language experts, the results of practicality tests from teachers and students as well as the results of the effectiveness test of increasing pre-test and post-test results after using learning media and learning outcomes above the Minimum Completeness Criteria (KKM). Interesting media or learning aids can increase student learning motivation so as to improve student learning outcomes. In addition, mock-up-based android media increases student activity in learning which can develop meaningful learning for students.

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