



## **Development of Android-Based Learning Media Using Microsoft Powerpoint Integrated Ispring Suite on Class X's Work and Energy Materials**

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Received: June 2022; Revised: July 2022; Published: July 2022

### **Abstract**

Learning is directly realized from the interaction process between educators and students, supported by learning resources, learning media, and other learning components. As time progressed, various learning problems, especially physics subjects were found, for example, the Covid-19 pandemic, which made it difficult for educators to provide and deliver material to students in class. This study aims to produce valid, practical, and effective android-based interactive learning media on work and energy materials. This learning media uses the ADDIE development method with stages up to Implementation only. After developing the product, the researcher used an assessment questionnaire to determine the product's validity from the media and material aspects. After that, the researcher tested it on physics subject teachers and 36 students at SMAN 14 Surabaya to determine the practicality and effectiveness of learning media. The results of the study obtained the value of media and material validity with an average percentage of 78.5% in the appropriate category, the practicality of the media obtained an average percentage of 93.5% in the very practical category, and the effectiveness of the media can be seen from the increase in learning outcomes students who get the effectiveness of 0.70 in the high category. Thus it can be concluded that the media is feasible and practical to use in the learning process and is very effective in motivating students to learn physics.

**Keywords:** Learning Media, Android, Microsoft Powerpoint, Ispring Suite, Work and Energy

**How to Cite:** Stevani, F., & Sucahyo, I. (2022). Development of Android-Based Learning Media Using Microsoft Powerpoint Integrated Ispring Suite on Class X's Work and Energy Materials. *Prisma Sains : Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 10(3), 688-699. doi:<https://doi.org/10.33394/j-ps.v10i3.5422>



<https://doi.org/10.33394/j-ps.v10i3.5422>

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## **INTRODUCTION**

The current coronavirus pandemic makes it difficult for some teachers to provide students with learning material. This pandemic has replaced learning strategies in schools which are usually carried out straightforwardly with direct conversations, questions and answers, experiments and analysis into web-based or network-based learning methods (online) and using blended learning methods. The online learning method is a method that does not need to be face-to-face between teachers and students but can be implemented online, which utilizes the internet network (Afrian, Ellianawati, and Susilo, 2021). Meanwhile, Blended learning is a mixed method of traditional classroom learning (face-to-face/classical) with digital or online-based classes (Widiara, 2018).

Changes in methods or strategies in learning can cause new problems. For example, the learning atmosphere becomes less conducive, educators find it challenging to provide information or knowledge, and students have difficulty mastering the material, especially in science subjects, especially physics, which contains a lot of material, formulas, equations and mathematical calculations (Napaswati, 2020). The problem indirectly arises due to the

limitations of the learning media used by educators. At the same time, the media plays a vital role in learning, where learning is formed because there is a direct relationship or interaction between teachers and students, supported by components such as learning media and learning resources. So without the media, teaching and learning activities cannot (Novika, Harahap, and Rahmadany, 2021). The use of media will increase new interest and desire in learning, as well as foster motivation and encouragement to learn in students (Astuti et al., 2017).

With the development of technology and science that is very fast, teachers are required to have creativity, especially the ability to design and the capacity that is useful for planning interesting and latest material using technology. Follows Permendiknas No. 16 Tahun 2007, where teachers are required to use, utilize and master information and communication technology (ICT) innovatively to assist in self-development, and the decisions made will be very strategic (Zainudin and Pambudi, 2019). One technology that is experiencing rapid progress (Marhadini et al, 2017), is trendy and has become an immediate need for students today is the android smartphone (Daeng et al., 2017). Android smartphone is a mobile operating system that has developed among other mobile operating systems (Widiara, 2018). The android operating system is open so that users can enter any application through the Playstore or not (Vilmala and Mundilarto, 2019). Android smartphones have many advantages besides voice calls; we can use available services such as messengers, games, social media, communication intermediary media with colleagues or friends, and find information quickly and conveniently. With android smartphones that continue developing, it should become commonplace for students to use smartphone and print technology together in their learning activities (Khumaidi and Sucahyo, 2018).

From the explanation above, it is necessary to develop innovatively and varied learning media such as Android-based so that it does not only refer to book sources. If the media used is attractive, communicative, and technology-based, it can make the learning process very effective and produce competent students according to the field.

The development of android-based learning media can be done by utilizing computer programs. Still, the obstacles that are often encountered in schools are educators' lack of abilities and skills in utilizing programming (software), especially applications and programming in making android-based learning media. Even though these difficulties now have a solution, which is by using software that makes it easier for educators to make or assemble an android application system. This software is Microsoft PowerPoint, Ispring Suite, and Website 2 APK Builder, so educators do not need to have high computer skills to create an application product such as coding (Wulandari, 2020).

Microsoft PowerPoint software was chosen because most teachers or educators already know how to operate it, and the features in Microsoft Powerpoint can be used easily (Masykur et al., 2018). In addition, using the Ispring Suite software is also appropriate because it has many advantages, including creating e-learning content types by combining quiz features, videos, dialogue simulation voices, interactions, and screen recorders in one learning media (Irwanto and Nurmalatika, 2019). While the other one software is only used to help change the name of the media storage file type. To create an Android-based learning media, integrate the Ispring Suite software with Microsoft Powerpoint software. After loading the design in Microsoft Powerpoint software, the media can be saved in HTML5 form. Furthermore, media with HTML5 format must be formatted into Android Package Kit (.apk) by utilizing the Website 2 APK Builder program or software. After the media format (.apk) has been completed, the Android-based media can be shared with students through applications that are familiar to students, namely Whatsapp or Bluetooth.

Android-based learning media, especially in physics, have been widely developed, and the results of these studies can make learning effective. The first reference was made by Branchais and Rasid Achmadi (2019). This research is a research development of learning media in the form of an android application using global warming material and its symptoms. The target class is XI SMA using the ADDIE research model. This media was validated by

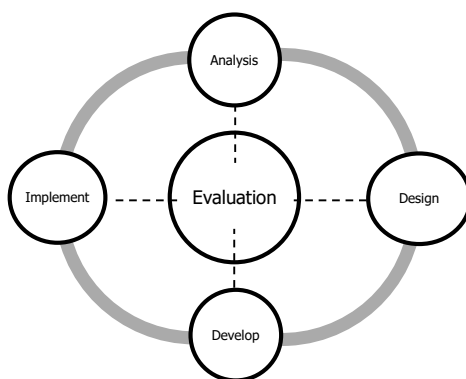
two lecturers, with a material feasibility level of 93.75%, linguistic feasibility reached 92.50%, media work process feasibility reached 93.75%, media display feasibility was 91.67%, and media engineering feasibility was 95.83% so that if the average feasibility level gets a score of 93.18% with very valid criteria.

Another study was conducted by Sasahan, oktova, and Oktavia (2017). This study develops interactive teaching materials using Ispring Suite 7 with the main discussion of light interference to students. The researcher gave a questionnaire sheet to material experts, media experts, and students so that the appropriateness scores reached 87.94%, 90.44%, and 87.99%, respectively. So that the development media is very feasible and can be used as a learning tool for each individual. Furthermore, Astuti, Sumarni, and Saraswati (2017) developed physics teaching materials based on android (mobile learning). From the feasibility results, this development product shows results with an average of 82.25% with valid criteria for use in physics learning. Other research that becomes a reference for researchers is research from Cahyana, Paristiowati, and Fauziyah (2018). This research also develops a mobile-based learning media about atomic structure. From the results of the overall feasibility test by experts, students and teachers get very good scores. This development can also motivate students to learn a lot and is suitable for use according to student needs.

Based on the background and the results of these observations, development research was conducted by formulating the following objectives: (1) to determine the process of developing android-based learning media using Microsoft Powerpoint integrated Ispring Suite on work and energy materials for class X higher secondary school; and (2) to determine the level of feasibility, practicality, and effectiveness of android-based learning media using Microsoft Powerpoint integrated Ispring Suite on work and energy materials for class X higher secondary school.

## METHOD

The development pattern used in this study is the ADDIE pattern. ADDIE is an abbreviation for Analysis, Design, Development, Implementation, and Evaluation. The advantages of this model are that it is easy to understand, structured, and interrelated. Therefore, the ADDIE model must be used gradually and thoroughly to ensure the formation of appropriate and effective learning media. However, in this study, researchers only developed it to the implementation stage. Given the limitations of the situation in terms of time and energy, the researchers considered the most crucial part of the core part. So that's the reason it didn't reach the evaluation stage but was only limited to validation tests, practicality tests, and effectiveness tests. The four steps of this research are analysis, design, development, and implementation.



**Figure 1.** ADDIE Model Development  
(Source: Sugiyono, 2018)

Learning media products that have been developed must first conduct a media feasibility test or product validation. Validation aims to assess the feasibility of materials and

media developed as physics learning media. In this research, two kinds of validation are carried out, namely the validation of material and media experts. Material and media expert validation was carried out by a lecturer who is competent in learning media development from the Department of Physics, State University of Surabaya. After being validated by the two experts, the researcher conducted a trial of the media on subject teachers and 36 X grade students at SMAN 14 Surabaya. Data obtained from questionnaires completed by subject teachers and students will be used to determine the practicality of the developed media. Then the authors conducted an effectiveness test. At this stage, the final data is obtained by using some questions before the application of the media in learning (pretest) and after the application of the media in education (posttest) to determine the level of effectiveness and consideration for improving the android-based learning media products that have been developed.

In research, determining data analysis techniques is an essential step because data analysis has the function of concluding and completing research results. Data analysis is done to see the value of each criterion or aspect that has been determined. The following is an analysis technique of each element.

First, analysis of expert validity data by changing the results of the evaluation or assessment of media experts and material experts in the form of letters into scores. Answers for each aspect of the instrument starting from very positive to very negative responses with the provisions of the score and its categories are; 5 (Very Good), 4 (Good), 3 (Quite Good), 2 (Poor), and 1 (very poor). Furthermore, to calculate the percentage of the media feasibility assessment, the researcher applies the Likert scale formula contained in table 1, and an explanation of the results of the analysis for each aspect of the evaluation or assessment can be seen in table 2. Following the provisions or scale belonging to Arikunto (2009), which states that the score in this research and development is determined with a minimum product feasibility value of "41% - 60%" so that it is included in the "Middle" category. The results of the evaluation or assessment are obtained from material experts and media experts. If the research receives the final results (overall) above the minimum requirements, then the media developed is feasible to use.

Table 1. Scale Formula likert

Formula	Description
$X = \frac{\sum M}{M_{max}} \times 100 \%$	$M_{max}$ = Maximum Score Aspect $\sum M$ = Total Score for Each Aspect of Value $X$ = Total Score Percentage

Table 2. Product Feasibility Scale (Arikunto, 2009)

Learning Media Eligibility Score	Criteria
0 – 20 %	Very Weak
21 % - 40 %	Weak
41 % - 60 %	Middle
61 % - 80 %	Feasible
81 % - 100 %	Very Feasible

The second is the analysis of practicality data, to analyze practicality data using the same pattern as validity, namely by changing the letter value into a percentage score. The answer to each instrument item starts from the positive to the negative. The following are the provisions for scores and categories of practicality data; 5 (Very Good), 4 (Good), 3 (Quite Good), 2 (Poor), and 1 (very poor). Furthermore, to calculate the percentage of the practicality of the media, the data is calculated using the Likert scale formula as in table 3. After getting the rate of the total score, the researcher can interpret each aspect of the evaluation or assessment (see table 4).

Table 3. Scale Formula likert

Formula	Description
$P = \frac{f}{N} \times 100 \%$	$N$ = Skor maximal tiap aspek nilai $f$ = Jumlah skor tiap aspek nilai $P$ = Presentase skor total dari tiap aspek

Table 4. The Practicality Scale Of Learning Media (Riduwan, 2009)

Learning media Practicality Score	Criteria
0 – 20 %	Not Pratical
21 % - 40 %	Less Practical
41 % - 60 %	Pretty Practical
61 % - 80 %	Practical
81 % - 100 %	Very Practicle

In the third analysis of effectiveness data, analyzing effectiveness data can be obtained by applying the effective formula as in table 5. From these equations, the level of effectiveness of the media will be received. According to Hake (1999), the category of increasing results can be determined using the data analysis technique of normalized gain scores. To interpret the value of N-Gain, Hake makes provision of scores and criteria, namely;  $g > 0.7$  (High),  $0.3 \leq g < 0.7$  (Medium), and  $g < 0.3$  (Low). If the average score of the students is 0.70, then the development product being tested has met the effective criteria to be used as teaching materials or learning media.

Table 5. The Formula for The Effectiveness Product

Formula	Description
$(g) = \frac{(\bar{x} \text{ end}) - (\bar{x} \text{ beginning})}{100 \% - (\bar{x} \text{ beginning})}$	$(\bar{x} \text{ beginning})$ = The Avarage Value of The Pretest $(\bar{x} \text{ end})$ = The Avarage Value of The Posttest $(g)$ = Level of Effectiveness

## RESULTS AND DISCUSSION

### Development Result

Based on the research that has been carried out, the results obtained include all the processes that have been defined in this development using the ADDIE method. The first stage is the analysis stage (Analysis). At this stage, the researcher analyzes the problems in the classroom and the needs in developing media. The issues that arise are as follows: limited time in physics lessons due to the Covid-19 pandemic, which should have been  $3 \text{ JP} \times 45$  minutes to  $3 \text{ JP} \times 25$  minutes. So many materials are not completed and conveyed correctly because they are in a hurry. The teacher has difficulty providing material which makes students finally given homework and learn independently. The two learning systems have changed, such as initially 100% online to 50% online and 50% offline due to the decline in Covid-19 cases. After that, the school gave a policy that is 100% online again because cases of omicron (the newest variant of covid-19) increased.

The impact of changes in the learning system makes students required to adapt and get used to the new system, which may lead to learning saturation (Rahmi, 2020). After that, from the results of interviews, teachers usually prepare simple teaching materials in learning, such as only providing material in the form of powerpoints, pdf files, or asking students to summarize the material contained in textbooks through educational media platforms such as Google Classroom. But over time, the teacher observed that most students did not open it, so the provision of teaching materials was deemed ineffective. On the other hand, teachers also have difficulty engaging in technology-based media and have not maximized the device as a teaching tool. Therefore, the researcher wants to develop an android-based media that is intended to overcome the problems that exist in schools.



Next is a needs analysis, in developing learning media, of course, researchers need several relevant research references that are aligned to help smooth writing in this research. So from some of the research described in the introduction, it can be concluded that android-based learning media is suitable for use in physics lessons. The article's relevance to this research is that they both develop Android-based physics learning media, either using Microsoft Powerpoint integrated with the Ispring Suite or other software. In this study, there are several differences from the article above, namely the learning materials used, the research targets or subjects, and the media maker that is still rarely used. These are some of the points of view that make this research different from previous research. Based on the analysis of problems and needs, the researcher began to proceed to the next stage.

The second stage is the design stage. Researchers began to design media as an essential reference for developing learning media at this stage. First, the researchers prepared to learn tools in advance, including a syllabus, learning implementation plans, and attachments, including files in the form of student worksheets, assessment sheets, and questions for the initial test (pretest) and the final test (posttest). After compiling the learning tools, the researcher designs a flowchart. The flowchart describes the flow of the systematic process of the application being made. After that, it is continued by creating a storyboard that aims to facilitate the preparation of the application's features or media being developed. Researchers can quickly move on to the next stage by learning tool materials, flowcharts, and storyboard designs. The following steps are to realize the appearance of the developed media. So to make it happen, the panelists used Microsoft Powerpoint 2019 integrated with Ispring Suite 10. Learning materials or tools were designed with slides measuring 10.8 cm for width and 19.2 cm for height on Android.

The third stage is the development stage. At this stage, the researcher begins to develop media with the designs that have been prepared. After that, the researchers carried out prototypes and testing to determine whether each media feature's function was running well. After that, the media was validated by material and media experts. In the validation process, the media received some input, and some features needed to be revised. The following are the display and parts of the learning media developed by researchers and validated. It starts with the front page display design, and the main menu in Figure 1 is made as simple as possible with a simple layout so that users are comfortable in using class X work and energy learning media. On the front page are pictures of examples of the application of effort and energy that occur in life. Daily. Then the media also has several characteristics, such as those contained in the main menu, which consists of instructions for use, core competencies (KI) and essential competencies (KD), videos/animations, materials, summaries, quizzes, references, and finally, the developer profile menu or researcher.



**Figure 2.** Font Page Display and Main Menu

So that students can find out how to use work and energy learning media for class X, the developer also makes a user manual menu feature. So that users will find it easier to operate class X work and energy applications when opening the manual user menu. The menu displays instructions for opening the material menu to the following menu, which is a

quiz. Furthermore, the KI and KD menus, this menu contains details and brief explanations of core competencies or abbreviated KI and essential competencies or KD that students must understand. The fundamental competencies in this application use the subject matter of work and energy.

The material menu, in android-based learning media, presents physics material, namely work and energy. So that the menu display is divided into two parts, namely work and energy. Furthermore, in the material section, the media is equipped with examples of questions and discussions, supporting images for each subject matter, examples of applying the material in everyday life, and student worksheets. Here is a visual image of the material menu.



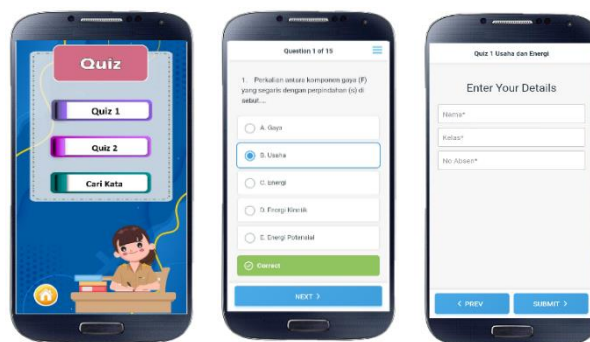
**Figure 3.** Work and Energy Material Menu Display

This video or animation menu is a page that contains videos that discuss effort and energy as general knowledge related to the material presented. The video or animation runs when the user clicks the pause button on the screen, after which the video will start. These videos and animations are equipped with sound or audio using English to optimize learning physics in English. Here is a video display or animation of effort and energy.



**Figure 4.** Video Or Animation Menu Display

The quiz menu is made as an evaluation for users. The quiz menu presents several game-based practice questions with processing time and scores for each student, which the students will do. This quiz is structured to help students remember the subjects that have been learned and delivered efficiently. This quiz can also be used for a test at the end of the lesson because the grades, along with the students' right and wrong answers, will go directly to the teacher's email so that the teacher can track the students' understanding. There is a menu on the quiz to fill in personal data such as name, class, and missing student numbers. Here are the outside and inside of the quiz slide.



**Figure 5.** Quiz Menu Display

The last part of this android-based learning media contains a summary or summary of the materials from work and energy. For reference menus that include reference sources for content in class X work and energy applications, including material sources, image sources, and animation or video sources.

After that, the media is validated by media and material experts to determine whether the media is feasible. If media experts, material experts, and teachers have stated that the product is ready to be implemented, then the product will be tested on research targets according to the initial planning.

The last stage of the product is the implementation stage. The product developed was tested with the research target of 36 students from class X MIPA 2. Android-based learning media on work and energy material for class X was distributed to the Whatsapp Group of students, the reason being that the media was often used by students there. At this stage, the subject teachers and students are given a questionnaire to measure the practicality of the media. They are given pretest and posttest questions to measure the effectiveness of the media.

### Validity Media

After the development stage is complete, the next step is to analyze the data from the validity or feasibility test results by the validator and the responses of the students. Here are the product test results data.

**Table 6.** Product Validation Test Recapitulation

Examination	Score	Category
Material Validation Test	62%	Feasible
Media Validation Test	95%	Very Feasible
Average Percentage	78,5%	Feasible

Based on expert validation analysis, it shows that android-based learning products get an average score of 78.5%, and the validity test category is "Feasible" or "Valid" the score is obtained from the results of material validation tests and media validation. In the media material validation test, the average score reached 62%, so the results were included in the "Feasible" category. The indicators that are considered lacking are in the use of words and language because the writing in the media does not have spaces for certain types of androids during the assessment, and some sentences are not clear. However, the indicators of the suitability of the topic with KI/KD are clear and reasonable, and the concepts used are correct. To fix the deficiencies in these indicators, the researchers changed the "Package Name" and "Version Name" in the application system to reduce the risk of errors such as the absence of written spaces. Then the media validation test results obtained an average of 95%, indicating the aspect category is "Very Feasible." Then the media follows the criteria (Arikunto, 2009). Based on the presentation of the data and criteria said, it can be concluded



that the android-based teaching materials are of good quality and feasible to be used as physics teaching materials, especially on the topic of work and energy.

### Practicality Media

After the validation test phase is complete, the next step is to test the practicality of the media by analyzing the data from the practicality test results by subject teachers and student responses, along with a recap of the results of the media practicality test.

Table 7. Product Practically Recapitulation

Examination	Score	Category
Physics Subject Teacher	95%	Very Practical
Student	92%	Very Practical
Average Percentage	93,5%	Very Practical

The The results of the practicality test above show that the physics subject teacher gives an average score of 95%, so the media is in the "Very Practical." Then for the practicality test, students get an average score of 92%, which shows the "Very Practical" category, then the average percentage reaches 93.5%, and the criteria are "Very practical."

Indicators that excel in media are in the context/content and use/presentation sections which are flexible, easy to understand, and operate independently. According to Rahmat et al., (2019), by using-based the learning media android, students will feel the ease of learning physics material using smartphones. In addition, the use of suitable media will make students learn quickly and feel comfortable enjoying learning (Rivai et al., 2021). Based on these data, it can be concluded that android-based teaching materials in work and energy materials are very practical and can be used as physics learning media.

### Effectiveness Media

At this final stage, the effectiveness of the learning media is tested in physics learning. The researcher gave some varied questions in the form of multiple choice. From the results of the effectiveness test, it was found that the student's score data had two values, namely the initial test score (pretest) and the final test score (Post-test), see graphic figure 6. And the following is the data on the effectiveness test results, which can be seen in table 8.

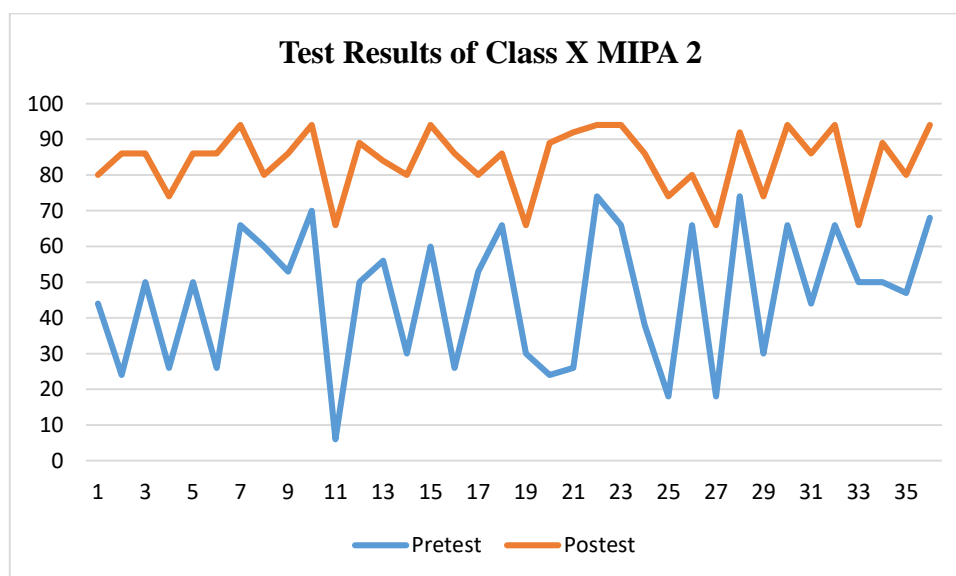


Figure 6. Pretest and Posttest Results

Table 8. Product Effectiveness Test Result Recapitulation

Class	Average Score		Gain Efektivitas (g)	Category
	Pretest	Post-test		
X MIPA 2	46,41	84,08	0,70	High

Based on the results of data analysis in table 8, it is known that the average value of the pretest for class X MIPA 2 is 46.41. After being given learning using android-based learning media, students showed an increase in ability. The average post-test score reached 84.08, so the students' n-gain was 0.70 in the high category. So from the amount of Gain effectiveness above, it can be concluded that the product in the form of development media using Microsoft Powerpoint and Android-based Ispring Suite is very effective. This indicates that this learning media is very efficient so that it can support learning strategies, where students can learn at any time and do not have to be fixated on books or learning at school. This is also in line with Yeonjeong (2011); she stated that the use of mobile devices would be beneficial when students learn independently while the teacher participates by providing questions and encouragement to seek answers this is useful to ensure they understand. In addition to aspects of cognitive abilities, the use of android-based media in learning physics can improve other skills such as higher-order thinking, scientific thinking (Dasilva and Suparno, 2019) and divergent thinking to produce many solutions, answers, or unique ideas for the problems encountered (Mardiana and Kuswanto, 2017) as well as increasing students' competence in presenting and arguing (Liliarti and Kuswanto, 2018).

Another advantage is in the manufacturing process, and this developed learning media includes a form of innovation so that it is easy to make and does not use complicated programming or software or skills in applying programming languages such as coding and has prospects for further development with other materials. Its use is also very easy and practical, primarily when the teacher conducts learning evaluation activities. The teacher can find out the name, absentee number, class, correct or incorrect student answers, speed in doing work, and date or time students start working on questions sent directly via email so they can find out the learning abilities of high school students.

## CONCLUSION

Based on the results of the research and discussion above, as well as the implementation of learning media, it can be concluded that an Android-based interactive learning media has been developed using Microsoft Powerpoint integrated with the Ispring Suite on work and energy materials for high school. The development is carried out by applying the ADDIE model, where the stages are Analysis, Design, Development, and Implementation. Microsoft Powerpoint, Ispring Suite, and Web 2 APK Builder are the software used to develop the application.

After going through the feasibility test, practicality test, and testing the effectiveness of android-based interactive learning media using Microsoft Powerpoint integrated Ispring Suite on work and energy materials in high school, it was declared feasible and very practical with percentages of 78.5% and 93.5%, respectively. The media is claimed to be very effective, where the average value of the n-gain of students is 0.70 in the high category.

## RECOMMENDATION

Suggestions for teachers are android-based learning media that can be used when learning physics and used as a reference in developing attractive, innovative, and imaginative learning media. Researchers also specifically hope that this product can be utilized optimally by students to help in learning and understanding physics material, especially the subject of work and energy.

## ACKNOWLEDGMENT

The author would like to thank the supervisors who have guided the author from the beginning to the end of the article to be published. The author also expresses his gratitude to the physics teacher of SMA Negeri 14 Surabaya and the students of class X MIPA 2 of SMA Negeri 14 Surabaya.

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