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## **Development of Android Based Physics E-Module with Project Inside to Increase Pancasila Student Profiles**

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### **Abstract**

Policy of Indonesian government through Ministry of Education and Culture in implementation of *merdeka* curriculum give new view to achievement character of students. It called Pancasila Students Profile and project-based learning (PjBL) as an appropriate learning model with curriculum. This makes all subjects in applied curriculum contain values Pancasila Students Profile. As science, physics can be designed to contain values Pancasila Students Profile and project-based learning by using media formed of e-modules. Based on the matter, researchers carry out related R&D with use of e- modules physics with integrated of Pancasila Students Profile and PjBL. The objectives of this research are describing characteristics of e- module android-based for high school physics with project contain and its effectiveness on Pancasila Student Profiles. The method of this study is R&D with the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. This study produced e-module android-based for high school physics with project-loaded. E-module has characteristics typical that existed Pancasila Students Profile and projects simulation inside. The developed e-module proved to be very useful when used, according to evaluation experts. Implementation of e-modules physics in learning can increase whole dimensions of Pancasila Students Profile namely dimensions believe, fear to God Almighty, morals noble, global diversity, independent, creative, critical thinking and cooperative. E-module proved its practicality, according to user view.

## INTRODUCTION

The development of technology in information and communication is growing very rapidly. Various convenience technology, information and communication are enjoyed by humans. The digitalization system enters various fields economic, social, culture, education, art, and so on. It makes people always need a device that supports information and communication.

Indonesia is a country with huge digital information and communication technology user. Based on survey results from educational ministry in 2017 shows that as much as 66.31% of Indonesian people have smartphone. Based on this amount, the Indonesian people who have smartphone based on education level are at the elementary level as much as 40.87%; junior high school as much as 59.89%; senior high school as much as 79.56%; bachelor degree as much as 93.02%; and master/doctor degree as much as 100%.

The percentage use smartphone by students can be utilized for developing learning media that can be accessed through smartphone. Educators can take advantage of this moment to direct students to use smartphones in learning activity. The flexibility of smartphones can help students to do their learning activity anywhere and anytime.

Utilization of smartphone in learning is one alternative to use support good learning. Learning activity by smartphone is called mobile learning. Mobile learning is a technique that uses wireless and cellular technology in learning activity (Sarrab & Elgamel, 2013: 1412). All new learning activities are possible through mobile learning empowered by system operation of cellular technology especially the android platform which is found everywhere. Android mobile based platform is device that is important to communicate for many people especially in the young generation like school students (Hanafi, 2012). Smartphone with android system operation to be the most favorite mobile for students because it is very easy to use and the price is relative affordable (Darmaji, et al., 2019: 292).

Covid-19 pandemic that hit the world has an impact on the changing world of education method characteristic learning from direct learning become distance learning. Learning media that can be used to support distance learning is electronics module (e-module). E- module can be used independently by students (Komisesari, et al., 2020: 9). E-modules can increase excitement in learning and student's skills (Yulkifli, 2022: 101). Matsun, et al (2019: 4) stated that use of e-modules in learning activity can develop learning outcomes significantly. Because it can be accessed by each student from home, the use of e-modules can support student's learning activity in their home. Not only it can be used in home, but also can be used as learning media in schools.

New paradigm from merdeka (it means freedom) curriculum that is to develop student's competency in accordance with interests and talents that make the learner throughout strong character of life in accordance with Pancasila's values (Nurasiah, 2022: 3646). This paradigm is clearly bringing learning activity with various values become learning activity that loaded Pancasila's values. Presented by Susilawati, et al (2021:166) Pancasila student profile implemented in daily activity in every student through characteristics of education institution, learning intracurricular, co-curricular and extracurricular.

Based on achievements learning of senior high school physics that through scientific attitude scientific and Pancasila student profile in particular independent, innovative, critical thinking, creative, and cooperation (Ministry of Education and Culture, 2022). To support development of soft skills and character in accordance Pancasila student profile, then learning activity already should done with based project. Research conducted by Baran, et al (2018: 231) shows that project-based learning can have positive impact on cognitive, emotional, and psychomotor of students. Learning based projects can increase participation and creativity of participant students (Gunawan, et al. 2017: 172). Research results show that learning physics-based project is the right learning model to be implemented in merdeka curriculum.

Entering the era of super smart society 5.0, computing taken the central role. Public interaction through computer networks has become a new phenomenon. It showed the importance of a method called think computational thinking for humans that want to develop creativity and adaptable in the 21st century (Araya, et al. 2020: 13). Based on that matter, there is step to embed computational thinking method through learning activity at school so it can form good human resources in accordance 21st century.

Based on the description above, it is important to study related to the development of e-modules with computational thinking method. E-module can be implemented in learning physics activity so it capable to goals learning achievements and character in accordance Pancasila student profile. Thereby it is good reason for researcher to make topic research "Development of Senior High School Physics E-Modules with Project-Loaded to Reveal Pancasila Student Profile ". The objectives of this research are describing characteristics of e-module android-based for senior high school physics with project contain and its effectiveness on Pancasila Student Profiles.

## METHODS

This study used research and development methods. Research and development is a method of study to produce something specified product and tested effectiveness the product (Sugiyono, 2011). Researchers use the ADDIE (Analyze, Design, Develop, Implement, and Evaluate) model to do this study. Analyze step performed covers analysis of android-based high school e-module needs by using literature review. After that, e-module was designed in accordance needs of physics learning at senior high school level. We develop this e-module by doing validation tests by materials, media, and learning experts. After getting input from correction from materials experts, media experts, and learning experts, then the module must be revised. E-module that has been revised then implemented in physics learning activity. Evaluation done for determining e-module effectiveness on Pancasila student profile after applied in learning activity.

Analysis used to describe e-module characteristics is analysis descriptive. This research produces a product in the form of an Android-based physics e-module with project contents. This product is an electronic document used as research and development data. The characteristics of the developed e-module will be identified so that people can know the description of the product and distinguish it from other similar products. The description is based on the results of Focus Group Discussion (FGD).

The feasibility test of the e-module is carried out using a validation test by experts. There are three experts in question, namely media, material, and learning experts. To obtain validation data, it is carried out by using an attitude scale based on the indicators developed so that quantitative validation results are obtained. Based on these results, the validator as an expert can conclude that the product being developed is feasible or not feasible to use.

E-module effectiveness to increase Pancasila student profile shown by comparative analysis. Comparative analysis is a technique analysis which compare two pieces the same element for a number of successive periods. Researchers use questionnaires at the beginning and at the end then only has 2 outcome data sets measurement, it called beginning and end questionnaire. Beginning and end Questionnaire of this study are formed of an attitude scale related to the values in the Pancasila Student Profile. The difference of average value from the initial questionnaire and final questionnaire can be concluded about increasing Pancasila student profile. These results are also supported by qualitative data from observations made by researchers.

Practicality analysis of the e-module based on results questionnaire by user (students and teacher). Questionnaire practicality using the Technology

Acceptance Model (TAM). Individual differences and system characteristics are external variables that influence individual interest in using information technology through perceived ease of use, perceived usefulness, and attitudes (Hong, et.al, 2002: 101).

## RESULTS AND DISCUSSION

### Description Characteristics of Charged High School Physics E-Module Project

E-module developed described based on 9 (nine) characteristics, there are: layout, content, self-instruction, self-contained, stand alone, adaptive, user friendly, activity learning, and typical characteristics. Explained by Susilana & Riyana (2018) that development good module must notice characteristics self-instruction, self-contained, stand alone, adaptive, and user friendly. Whereas layout characteristics, content, activities learning, and characteristics typical are additions characteristics provided by the researcher, so the e-module can own more complete characteristics.

The function of the developed e-module can be highlighted by using simple layouts without making it too complicated. Use the appropriate size letters to make the e-module easy and clear to read. However, it would be better if it were added an illustration picture to strengthen the impression from the mark Pancasila students profile found in "Physics Musings".

Learning material kinematics motion in line with objective learning. Kinematics motion covers dividing into two sub-principals' material those are one-dimensional and two-dimensional motion. The material is aimed at analyzing velocity and acceleration quantities, projectile motion, circular motion, and a motion simulation project. Learning materials have already been customized with the necessary concepts for making a simulation project.

Project based learning characteristics are very visible from e-module title and guiding material to project-based learning. However, it will be better if the e-module shows guiding steps for students to finish the project that exists control and monitoring progress. It will be better to add timetable processing projects and worksheet integrated in it.

Fulfillment characteristics self-instruction seen in the e-module who delivers chance for students to study independently. E-modules that has developed provide an interactive test of understanding and product completion guide videos that require students to study independently.

Self-contained in the developed e-module looks at students who can learn completely and intact because it includes studies of learning materials quoted from teaching materials that have good credibility on fundamental physics concepts such as basic physics books by Tipler, Serway, and Giancoli.

The high school physics e-module that has been developed has a wide and in-depth range of learning materials, so it is very adequate if used as a learning resource without having to rely on other learning resources. This shows the characteristics of stand-alone, namely the e-module can stand alone without depending on other learning sources.

Adaptation to the development of science and technology is very visible in the developed physics e-module. The use of science and technology in e-modules that have been developed is very visible in it. This is by looking at the concept that is carried out in the e-module itself, namely project-based learning where the science of physics and information technology goes hand in hand with the completion of a simulation project. In addition, the use of e-modules also shows the use of technology in learning activities by using digital books.

The use of simple navigation buttons and a display like a printed book makes Android-based high school physics e-modules very easy to operate. The use of learning media like this does not require special abilities for users in the digital era. Therefore, the android-based high school physics e-module is quite easy to use (user friendly).

Judging from the learning activities conducted in the developed e-module, the use of project-loaded high school physics e-modules can support learning activities covering aspects of knowledge, attitudes, and psychomotor. The provision of motion kinematics material equipped with understanding tests and quizzes makes students active in learning on the knowledge aspect. Providing a "Physics Musings" makes students active in learning the attitude aspect according to the Pancasila student profile which is in line with physics material. Project learning activities make students active in learning that supports aspects of psychomotor.

Another thing that characterizes the physics e-module that researchers have developed is the project content in it. This project-laden high school physics e-module was created to support project-based physics learning. Project-based physics learning can encourage students to increase their creativity. As stated by Novianto, et al (2018: 90) in his research the use of project-based teaching modules can increase student creativity. The developed physics e-module contains kinematics material with the direction of working on a motion simulation project with the help of the scratch application. Through a motion simulation project using scratch, students can freely express their creativity. This results in interesting motion simulation works.

Researchers have developed a physics module for high school in electronic form. The

advantages of e-modules when compared to printed modules are that they are portable, practical and complete. E-modules are portable because they are installed on smart phones that can be used anytime, anywhere and do not require a large space in their storage. The operation of the e-module is very easy because it is equipped with navigation buttons that can direct you to the desired page quickly. The developed e-module in the form of a flip book also contains interactive exercises and assessments that are integrated into it. E-modules are equipped with text, images and videos which make them complete learning media or called multimedia. This advantage was also conveyed by Suarsana and Mahayukti (2013: 194).

The high school physics e-module that has been developed has a distinctive feature compared to other e-modules, namely the integrated content of the Pancasila Student Profile. The Pancasila Student Profile is included in the form of simple reading text which contains dimensions of faith, piety to God Almighty, and noble character, global diversity, independence, mutual cooperation, critical thinking, and creativity. The dimensions of the Pancasila Student Profile are embedded in the e-module in a section called "Physics Musings". This aims to show that the concepts of physics and learning are closely related to the six dimensions of the Pancasila Student Profile. The e-module gives the impression that the concepts, implementation, and learning of physics also carry the mission of conveying the Pancasila Student profile. As stated by Shofa, et al (2020: 85) that the process of learning science includes observing, discovering, understanding, and experiencing what was created by God, both natural and social phenomena, will make students aware of the existence of God and his attributes. This shows that physics as a science can make students aware of the existence of God through his creations in the form of natural phenomena. Reflection on physics provides firmness that the concept of learning physics is directly related to the concept of divinity.

### **Feasibility of Loaded Android- Based High School Physics E-Module Project**

The feasibility of project-laden high school physics e-modules can be seen from the expert's point of view. Researchers conducted e-module product validation tests on material, media, and learning experts in order to obtain expert views so as to produce better e-module products. Material expert validation tests are carried out by physics education lecturers with a credible level of expertise. Table 1 is the result of material expert validation.

**Table 1.** Material Expert Validation Test Results

<b>Aspect</b>	<b>Validation Results (%)</b>
Material Quality	84.00
Material Accuracy	84.00
Material Update	80.00
<b>Average</b>	<b>82.67</b>
<b>Criteria</b>	<b>Very Feasible</b>

Based on Table 1 it can be seen that the project-laden high school physics e-module that has been developed has very feasible criteria with an average score of 82.67%. The e-module validation test by material experts includes 3 (three) aspects, namely the quality of the material, the accuracy of the material, and the updating of the material. Each aspect received successive gains of 84.00%, 84.00% and 80.00%. The conclusion conveyed by the validator is that the Project-Loaded Android-Based High School Physics E-Module is feasible to be tested without revision.

As for the suggestions made by material experts, it is hoped that researchers can broaden the topic and present more detailed material. Researchers made improvements in the form of adding circular motion material and reducing

mathematical equations. The following is Table 2 regarding e-module improvements according to material expert suggestions.

**Table 2.** Suggestions and Improvements to the E-Module in terms of material

<b>Suggestion</b>	<b>Repair</b>
The topic should perhaps be expanded and further detailed	The addition of circular motion material and the derivative of mathematical formulas

The media expert validation test was carried out by physics lecturers who are experts in physics learning media. The results of the media expert validation test are shown in Table 3.

**Table 3.** Media Expert Validation Test Results

<b>Aspect</b>	<b>Validation Results (%)</b>
Screen Design Effectiveness	80.00
convenience Operation	90.00
Consistency	90.00
Format	80.00
Navigation	90.00
<b>Average</b>	<b>86.00</b>
<b>Criteria</b>	<b>Feasible</b>

The aspect of the media expert validation test consists of 5 (five) aspects, namely the effectiveness of the layer design; ease of operation; consistency; format; and navigation as shown in Table 3. The effectiveness of the screen design and format of the e-module obtained a validation of 80.00%, while ease of operation, consistency and navigation gained 90.00%. The average e-module validation result is

86.00% which is included in the very feasible criteria.

Based on the validation test by media experts, the expert said that the Project-Loaded High School Physics E-Module could be tried out with revisions. The suggestions from experts and improvements made by researchers are summarized in Table 4.

**Table 4.** Suggestions and Improvements to the E-Module in Terms of Media

<b>Suggestion</b>	<b>Repair</b>
- Please color <i>fonts</i> on <i>cover</i> module arranged repeat in contrasting color with <i>cover</i> module	- Adjustment color <i>fonts</i> on <i>cover</i> module with notice contrast
- Writing please identity module arranged in sentence or elongated phrase to right, no written down said and continued below	- Preparation e-module identity with phrase elongated to right
- Please for put the university logo placed in the corner right on <i>cover</i> module	- Place the university logo on the side right on <i>cover</i>
- Please fix again the module cover	- Repair the module <i>cover</i>
- Please use proportional <i>font</i> and check return writing every word for minimize error writing	- Adapt <i>fonts</i> on e- modules so that seen proportional and correct the wrong word (typography)

The validation test of learning experts was carried out by high school physics teachers who had a lot of experience in learning physics in high school.

Table 5 is the result of the validation of learning experts.

**Table 5.** Learning Expert Validation Test Results

<b>Aspect</b>	<b>Validation Results (%)</b>
Use of Loaded E-Modules Project	100.00
Steps of Learning	92.50
Pancasila Student Profile	93.33
<b>Average</b>	<b>95.28</b>
<b>Criteria</b>	<b>Very Worth it</b>

**Table 6.** Suggestions and Actions Carry on E-Module Validation in Learning Aspect

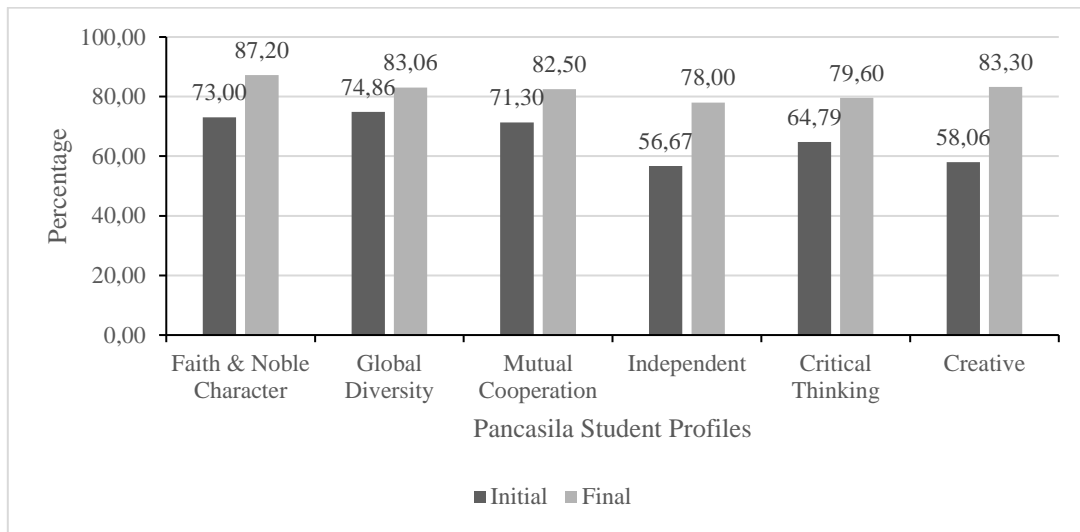
<b>Suggestion</b>	<b>Follow Carry on</b>
Please make book e- module guide	Making book guidelines simple for use of e-modules physics in <i>PDF</i> format

The aspects assessed in the learning expert validation test are the use of e-modules containing projects, learning steps, and the Pancasila Student Profile. Judging from the aspect of its use, the project-loaded high school physics e-module obtained an assessment of 100.00%. The aspects of learning steps and the Pancasila Student Profile obtained scores of 92.50% and 93.33% respectively. The average evaluation of e-modules by learning experts is 95.28% with very decent criteria. Based on these results, the learning expert concluded that the android-based high school physics e-module containing a simulation project could be tested without revision. The suggestion from the validator is that it is expected to add a user manual as contained in Table 6.

The researcher created a guidebook for the use of Android-based high school physics e-modules with projects with the aim that users can use the e-module properly. The e-module manual contains step-by-step instructions for installing, using, and removing the installation steps for smartphones based on the Android operating system.

**The Effectiveness of Project-Loaded High School Physics E-Module Project in The Improvement of Pancasila Students Profile**

The Pancasila Student Profile was obtained from a questionnaire filled in by students before and after carrying out learning activities. The following Figure 1 is a diagram of the percentage value of the Pancasila student profile prior and post of the learning activity.

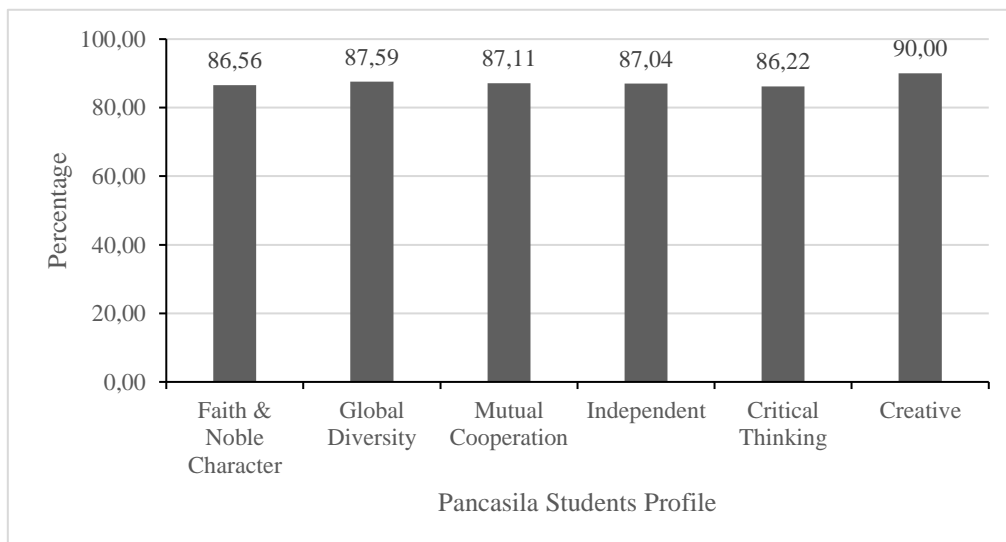


**Figure 1.** Diagram of the Percentage Value of Pancasila Student Profiles of Students Based on Questionnaires

Based on the results of the questionnaire, it can be seen that there was an increase in the value of the Pancasila student profile from students after learning by utilizing the high school physics e-module with projects in all dimensions. Students experienced an increase in the dimensions of faith, piety, and noble character, from 73.00% to 87.20% or an increase of 14.20%. The increase also occurred in the global diversity dimension from 74.86% to 83.06% or an increase of 8.20%. The mutual cooperation dimension increased by 11.20% from 71.30% to 82.50%. Student independence increased

by 21.33% from 56.67% to 78.00%. Students' critical thinking ability increased by 14.81%, from 64.79% to 79.60%. The creative dimension of students increased by 25.24% from 58.06% to 83.30%.

Apart from using a questionnaire, the researcher also used the observation method to strengthen the Pancasila student profile data through direct observation. Figure 2 is a percentage diagram of the results of observing the profile of Pancasila students in learning activities using project-loaded high school physics e-modules.



**Figure 2.** Percentage Diagram of Student Profile Values of Pancasila Students Based on Observation Results

Based on observer observations on learning activities, it was found that the profile scores of Pancasila students on the dimensions of faith, piety, and noble character averaged 86.56%, the

dimension of global diversity was 87.59%, the dimension of mutual cooperation was 87.11%, the dimension of independence was 87.04%, critical thinking was 86.22%, and creative was 90.00%. The

profile scores of Pancasila students are all in the very high category.

The use of android-based high school physics e-modules loaded with simulation projects has proven to be effective in increasing the profile of Pancasila students. This is due to the integration of the dimensions of the Pancasila student profile in the developed e-module. The dimensions of the Pancasila student profile are presented in the form

of "Physics Musings" as shown in Figure 1 which is a simple text that combines physics learning and the dimensions of the Pancasila student profile. This combination shows that there is a relationship between the dimensions of the Pancasila student profile and physics learning. Therefore, learning physics can be held in schools by applying the dimensions of the Pancasila student profile.



**Figure 3.** "Physics Musings" in E-Module

Physics learning is done to reveal natural phenomena that occur. Natural phenomena that occur so regularly are creations of God. Therefore, it must be understood that the study of physics and the concept of faith is something related. Studying physics is an effort to understand the concept of divinity and faith through God's creation (Tebriani, 2020: 194). Tebriani's statement is in line with research results that the dimensions of faith, piety, and noble character have increased. These dimensions are included in the e-module in "Renungan Fisika" with the topic "If God Takes Just One Physics Quantity". This section discusses how physical quantity plays a very important role in human life. Through this text, readers are invited to do simple reasoning related to the relationship between physical quantities and the concept of divinity. God has arranged the universe in such a way that order is created. This is in accordance with the dimensions of faith, piety, and noble character in the profile of Pancasila students. Alamsah, et al (2013: 16) conducted research by linking physics learning with the Koran to produce that recognition of the majesty of the Creator from students can increase.

The developed high school physics e-module supports project learning activities. Projects

designed in learning are simulation projects using scratch. Project-based learning can increase student activity because learning is student-centered. This is as stated in similar research that project-based learning makes student activity high (Kristanti, et al, 2016: 127; Rodliyatin, et al, 2017: 409). The application of project-based learning makes collaboration activities high for the realization of learning objectives. Collaborative or aligned activities with mutual cooperation in the dimensions of the Pancasila student profile dominate simulation project-based learning activities. Students are required to carry out learning activities collaboratively in completing projects and actively use e-modules that are designed interactively. Hidayah & Suyitno (2021: 26), said that implementing learning using learning media can spur collaborative learning activities in accordance with the Pancasila student profile. So, in addition to the design of learning activities, learning media also influence collaborative activities in learning activities.

Project-based learning designs that require learning activities to be carried out collaboratively make students active in carrying out intense communication and interaction. Learning activities are carried out in groups with group members



designed heterogeneously in terms of their academic abilities. This results in interactions that do not distinguish a particular factor. The spirit of collaboration that occurs prioritizes the achievement of common goals. Each student respects the opinions of each other. The observation results also support that there are no observed elements of SARA (ethnicity, religion, race, and intergroup), communicate positively with each other, and are able to resolve disputes that occur in groups. Based on this, students have a Pancasila student profile, namely global diversity which increases after learning activities are carried out.

E-module was created to increase independence. In line with several studies that modules can increase student learning independence (Arumsari, et al. 2014: 38; Linda, et al., 2021: 198; Mulyasari & Sholikhah, 2021: 2234). The high school physics e-module containing a simulation project is designed to support student learning independence and is strengthened by the addition of "Physical Reflections" with a self-themed theme. This certainly makes the learning independence of students stronger after using it. The observation results also prove the high independence of students due to the emergence of elements of self-awareness and situations faced by each student in learning activities.

Students' critical reasoning abilities increase because the e-module is designed for project-based learning activities. As several studies on project-based learning have produced similar results. Project-based learning can improve students' critical reasoning abilities (Rachmawati, et al, 2018: 30; Pratama & Prasetyaningrum, 2016: 49; Permata, et al, 2018: 38).

Project learning is done by creating a simulation using the scratch application. Scratch is

designed to make it easier for users to convey computational thinking skills. The completion of this simulation project involves a lot of computational thinking skills. Computational thinking ability affects critical thinking ability. As research from Lestari & Annizar (2020:54) states that computational thinking abilities affect critical reasoning abilities.

Student creativity increases after project-based learning is carried out. The results of similar research are that project-based learning can improve creative thinking skills (Wibowo & Suhandi, 2013:75; Taryono, et al, 2019:102; Mukin & Maing, 2018:179). Through the learning activities of making simulation projects, students are given the flexibility to determine the type of motion simulation to make. This situation allows students to express their work and originality. The creativity of students can be seen during learning activities through observation, namely the emergence of indicators of making real works and conveying original ideas.

**Practicality of High School Physics- Based E-Modules *Androids* Project-Loaded**

The high school physics e-module product contains projects that have been developed and obtained expert validation and then tested in physics learning at SMA N 2 Pekalongan. Learning is carried out by utilizing project-laden high school physics e-modules as a learning resource. After the learning activities were completed, the researcher measured the level of practicality of the e-module based on the views of teachers and students on project-laden high school physics e-modules with the results as shown in Table 7.

**Table 7.** Response Results E-Module Users Using the TAM Model

Factor	Respondents	
	Students (%)	Teacher (%)
Computer Self-Efficacy	76.52	100.00
Knowledge Of Search Domains	85.28	100.00
Terminology	71.67	100.00
Screen Design	87.22	100.00
Relevance	88.33	100.00
Perceived Ease of Use	86.36	100.00
Perceived Usefulness	85.86	91.11
Attitude Towards using	84.26	80.00
Behavioral Intention to Use	82.50	100.00
Actual usage behavior	76.48	73.33
<b>Average</b>	<b>82.45</b>	<b>94.44</b>
<b>Criteria</b>	<b>Very good</b>	<b>Very good</b>

The user's view of the project-laden high school physics e-module that has been developed is carried out using the Technology Acceptance Model

approach. Technology Acceptance Model (TAM) is an information technology system product

acceptance model that is used to reveal how users accept new products that are being tested.

There are 10 (ten) product acceptance factors as measured by using a questionnaire, namely: Computer Self-Efficacy, Knowledge of Search Domain, Terminology, Screen Design, Relevance, Perceived Ease of Use, Perceived Usefulness, Attitude Toward Using, Behavioral Intention to Use, and Actual usage behavior. Based on Table 7, the assessment of project-laden high school physics e-modules obtained ratings from students in the range of 76.48% to 88.33% and from teachers in the range of 73.33% to 100.00% which were distributed across the 10 factors. Evaluation by students obtained an average of 82.45% and by teachers of 94.44% with both criteria being very good.

Based on the results of a practicality questionnaire using the technology acceptance model, the average rating is very good. This shows a very good level of acceptance by users because of its practicality. A teaching material can be said to be practical if the teaching material is easy to use and by looking at the form of the teaching material (Kurniawan & Syafriani, 2021). Teaching materials with excellent practicality are teaching materials in digital form such as e-modules (Usman, et al., 2020). This shows that the use of e-modules is proven to be more practical when compared to printed modules. The use of the familiar Android platform and the easy operation of the e-module makes the e-module practical to use. The use of e-modules can be done anytime and anywhere with small dimensions of space.

## CONCLUSION

Android-based high school physics e-module with a simulation project is an electronic physics learning module for high schools that fulfills the characteristics of self-instruction, self-contained, stand-alone, adaptive, and user-friendly as well as special characteristics, namely having a simulation project content and a Pancasila Student Profile. Android-based high school physics e-module loaded with a simulation project is very feasible to use in learning activities based on the validation of material, media, and learning experts. Android-based high school physics e-module loaded with a simulation project has proven to be effective in increasing the Pancasila Student Profile. Based on the results of the TAM questionnaire by users, the android-based high school physics e-module containing a simulation project is very practical to use.

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