

## Development e-modules based android in Newton's law topic for senior high school

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**Abstract:** Developing android-based teaching materials is an initial step to follow the presence of the society 5.0 era in the learning system. This study aimed to know the feasibility and practicality of an Android-based e-module developed on Newton's law material. This study is research and development using the 4D model from Thiagarajan with four stages of development: define, design, develop, and dissemination. The research instrument used is an expert validation sheet, students' reliability questionnaire, interview guide sheet, and e-module prototype with research subjects consisting of 50 students. The research instruments used are expert validation sheets, student reliability questionnaires, interview guide sheets, and e-module prototypes. The research subjects are 10th-grade students. The data analysis technique is quantitative descriptive. Based on expert validation, the feasibility analysis results show 94.86% and 90.8%. Results of the practicality analysis show a percentage of 100% based on the test results, which means that the android-based e-module developed meets the feasibility and practical aspects of teaching materials on Newton's law. The effective analysis results on the effective use of e-modules show N-gain 1,877 in the high category, which means that e-module developed is effective use as learning media in Newton's law material.

**Keywords:** android, e-module, feasibility, effectively, Newton's law, practically

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### INTRODUCTION

The presence of Society 5.0 as a complement to industrial revolution 4.0 (Suherman et al., 2020) requires all elements able to utilize technology or the Internet of Things (IoT) as communication tools. The development of Society 5.0 also impacted and changed the education mindset (Ali & Nihad, 2021). Today, conventional learning systems turned into digital-based learning through information and communication technology (Al-Qasyi et al., 2018; Salloum et al., 2018). Moreover, the appearance of the Covid-19 pandemic requires education to maximize the application of digital-based learning systems. In the last decade, there have been many studies examining the use of digital learning android-based media (Iskandar, 2021) as a solution to learning online during the pandemic as well as being the first step in implementing digital-based learning systems, one of which is by integrating Android as an operating system in making learning media. The development of Android-based learning media refers to students, with the majority of users of mobile phone Android platform version 4.1 JellyBean up to 9.0 Pie. Results of the observation show that all students have smartphones equipped with Android and iPhone operating systems, with ownership percentages shown in Table 1.

**Table 1.** Students' smartphone types used

| Smartphone types | Percentage |
|------------------|------------|
| Android          | 98%        |
| Iphone           | 2%         |

Table 1 shows that there are no students who do not have a smartphone, either an Android or iPhone. Results of needs analysis based on interviews with 20 students show that 75% of students were bored when studying Newton's topic in physics, so many of them lost their enthusiasm and interest when



studying it. The teacher still used conventional learning by lecture, while students only imagined the material without any supporting media. Besides, there is continuity between Newton's laws and formulas without direct application or simulation, making this material less interesting. The teacher only explains the material based on textbooks without giving real examples of simulations in everyday life. Therefore, it makes students lose interest in learning it. (Chen et al., 2021) states that discussion of Newton consists of a combination of letters and numbers to form a formula based on daily activities that lead to the basis of classical mechanics in physics. Newton's law cannot just be imagined (Infante et al., 2018), but it must be conveyed by learning media to make students understand easier. Material characteristics of Newton's laws that are concrete by describing the relationship between the force acting on an object and the motion it causes should be applied by giving real examples or simulations related to everyday life. It is important for teacher developed relevant learning media to break the notion that physic is difficult and boring. In Society 5.0. better if learning media developed based on digital systems combine audio-visual and animation so it is more meaningful and fun. The growing development of technology, especially using smartphones by students, indirectly changes how students learn. It cannot be denied that the presence of smartphones makes students addicted, so with this condition, teachers must be able to analyze the situation, one of which is by developing learning media based on operating systems on smartphones. Cone Learning of Experience by Edgar Dale state that people generally remember 50% of what they hear and see. So, it is interesting to develop digital-based learning media in Newton's topic, like previous research about developing physic digital-based learning media (Andriani et al., 2021; Eveline et al., 2019; Saraswati et al., 2020).

To solve these problems, researchers developed digital learning media, e-modules Android-based. E-modules were selected because it is can use as blended learning (Sumarmi et al., 2021) and independently (Sumarmi et al., 2021). Also, learning through e-modules effectively improves students' skills, such as science process skills (Serevina et al., 2018; Suryani et al., 2022) and critical thinking skills (Sari, 2021). To complete it more interactive, it adds audio-visual animation about Newton's law, so Flipbook was chosen as an app to create e-modules (Saraswati & Linda, 2019); state development of Flipbook of e-modules effectively improves students' understanding because it illustrates abstract material (Serevina et al., 2018) so it makes students easier to study Newton Law directly through relevant media learning. This Flipbook of e-modules was developed based on Android to be easily accessed anywhere and anytime. At the same time, students who have smartphones with operating systems other than Android are expected to be able to adjust to other students, either by joining or other alternatives. Students in this Generation cannot separate from smartphones (Hartley & Andujar, 2022). Besides that, students prefer mobile devices to desktop PCs because it is more practical and efficient in its use (Orlando et al., 2019). The researcher gave modernizations' effect to learning media developed with Android-based because its flexible, feature rich, and has many available apps. So, it is possible to create a learning media app in its operating system. In addition, students' characteristics who prefer studying with illustrations make this learning media developed in the form of a flipbook equipped with pictures and video illustrations about Newton Law adapted the current of science and technology today.

This research is one of the developments of smartphone operating system-based learning media innovations. This innovation developed is a novelty for students to overcome boredom and lack of interest in learning, especially in Newton's law material. Students can communicate two-way with interactive learning media by integrating Flippedbook into the Android operating system. With learning development, media is expected to be an alternative learning medium.

Based on the background, researchers conducted developing learning media Android-based e-module through a flipbook app on Newton's law topic. This research aims to know the feasibility, practicality and effectiveness of the Android-based e-module. To support research objectives, the following research questions are asked:

1. What is the feasibility of developing an Android-based e-module in Newton's law?
2. What is the practicality of developing an Android-based e-module in Newton's law?
3. How is the effectively developing Android-based e-module in Newton's law?

## **METHOD**

This study is development research to produce an e-module learning media app Android based on Newton's law topic. The e-module developed in this study was done in the form of Flipbook using Kvisoft Flipbook Maker 4 software. The development stages of e-modules follow the 4D model from

Thiagarajan (1974), with the stages are define, design, develop, and dissemination (Sugiyono, 2019). A specific explanation of the research design was carried out as follows. The first stage, define, contains the needs analysis of e-modules. Analysis was carried out by identifying problems, developing target analysis, evaluating resources, and determining product specifications to be developed. The analysis results at the define stage become the consideration for implementing the design stage.

The second stage is to design the product. Development software used to develop e-module is kvisoft flipbook maker 4. The result of this stage is an e-modules prototype that can be installed on Android-based smartphones, laptops, tablets or desktop computers. However, on this occasion, the focus was on developing Android-based e-modules. The third stage is development done with e-modules prototype test through 2 tests. The first test is validation by two experts validity. We decided on prototype e-modules validity and revisions based on the validity test results. The second test is a reliability test conducted by 30 students. Assessed aspects in this reliability are contexts (accessibility, instruction, layout) and content (picture, audio and animation). Based on the reliability test results, we decided on the prototype e-modules reliability and revisions.

The fourth stage is dissemination, done by applying e-modules in the classroom and dissemination by giving these e-modules to teachers in several schools. The application was carried out in learning physics on Newton's law material by involving 50 students of various genders. Field trials in this study were carried out on class X students involving two classes: one control class and one experimental class. The experimental design was carried out using a quasi-experimental pre-and post-test design.

### Research Design

Field trials in this study were conducted to test the feasibility and practicality of Android-based e-modules. Large field trials were carried out on class X students involving two classes, one experimental and one control class. The experimental design used a quasi-experimental pre-and post-test design, as shown in Table 2.

**Table 2.** Large Field Trial Design

| Group      | Pretest        | Treatment      | Postest        |
|------------|----------------|----------------|----------------|
| Experiment | O <sub>1</sub> | X <sub>1</sub> | O <sub>2</sub> |
| Control    | O <sub>1</sub> | X <sub>2</sub> | O <sub>2</sub> |

The research was carried out from January to March 2022. The research subjects were students with the demographic in class X who were taking Newton's law material. Sampling is done by probability technique—data collection through questionnaires, interviews and tests. Questionnaires were used to determine the feasibility and practicality of the developed e-module, interviews were conducted to analyze the situation related to the implementation of the e-module developed before and after, and the test was used to implement the developed e-module. Research instruments used are expert validation sheet, students' reliability questionnaire, interview guide sheet and e-module prototype. An expert validation sheet was used to conduct a validity test of the e-module prototype, students' reliability questionnaire and interview guide sheet were used in the reliability test, and the e-module prototype was used to disseminate to know its effectiveness. The data analysis technique is quantitative descriptive.

The feasibility analysis technique is performed validity calculation using the content validity formula with Aiken's Index (V) as follows (Retnawati, 2016).

$$V = \frac{\sum s}{n(c-1)}$$

Based on the V calculation results for the expert validation sheet instrument for the e-module validity test, an item is categorized based on its index. The validity category is used for decision-making on the validity level of the e-module in Table 3.

**Table 3.** Instrument validity category

| Aiken Index (V)    | Category    |
|--------------------|-------------|
| $V \leq 0,4$       | Less valid  |
| $0,4 < V \leq 0,8$ | quite valid |
| $V > 0,8$          | very valid  |

The practicality analysis technique is quantitative in the form of pretest and post-test questions with the normalized gain technique aims to see the magnitude of the increase in critical thinking skills and cognitive learning outcomes that arise due to the use of Android-based e-modules with the theme of Newton's law by looking at the normalized gain value ( $\langle g \rangle$ ) (Hake, 2007). The formula for calculating the gain score and the criteria is in Table 4.

**Table 4.** Calculation of the normalized gain score

| Formula   | Index $\langle g \rangle$              | Criteria |
|---|--|----------|
| $\langle g \rangle = \frac{T_2 - T_1}{I_2 - T_1}$ | $> 0,70$                               | High     |
| $\langle g \rangle$ Normalized gain score         | $0,30 < (\langle g \rangle) \leq 0,70$ | Medium   |
| T1 pretest score                                  | $\leq 0,30$                            | Low      |
| T2 Post-test score                                |  |          |
| Is Ideal maximum score                            |  |          |

Effectively analysis technique is inferential statistical analysis in the form of gain-normalized, normality test, homogeneity test, and t-test, obtained from students' tests. The results of the N-Gain value were then adjusted according to scoring criteria to determine the level of effectiveness in Table 5.

**Table 5.** N-Gain criteria

| N-Gain value          | Category |
|-----------------------|----------|
| $g > 0,7$             | High     |
| $0,3 \leq g \leq 0,7$ | Moderate |
| $g < 0,3$             | Low      |

This study used the Kolmogorov-Smirnov-Normality Test using a 5% or 0.05 level significance. Hypothesis testing criteria if significance is greater than the value of, then statistically, the data come from a normally distributed population. In the homogeneity test, the test used is Levene's Test. If the samples have the same variance, both are considered homogeneous. Levene's test uses a significance level of 5% or 0.05. Criteria for testing the hypothesis if the significance is greater than the significance level, then statistically, the two variants are the same, or the data is homogeneous.

The effect size was calculated after statistical significance was performed. The effect size obtained will talk about the estimated effect size in the population because of research (Santoso, 2010). Calculating the effect size is as follows (Cohen, 1988).

$$effect\ size(d) = \frac{(\text{experiment group mean}) - (\text{control group mean})}{(\text{standard deviation})}$$

Furthermore, the values are compared to classify the effect size into high, medium, and low, as seen in Table 6.

**Table 6.** Effect size classification for the comparison of 2 means

| Effect Size | $d$                   |
|-------------|-----------------------|
| Low         | $0,0 \leq d \leq 0,2$ |
| Medium      | $0,2 < d \leq 0,8$    |
| Strong      | $d > 0,8$             |

## RESULTS AND DISCUSSIONS

Results analysis in the define stage show that when physics learning, many students were bored and not interested in studying it, so its impact on learning outcomes. Data from 2020 to 2021 show that students' learning outcomes in physics, especially in Newton's law, decreased by about 2,57. Students can imagine what they learn because the teacher uses no learning media. It automatically impacts students' understanding and leads to learning outcomes. Based on this problem's identification, the need for learning media to solve decreasing students' learning outcomes also increases students' interest in studying physics, especially in Newton's law topic. Therefore, the development target of this research is

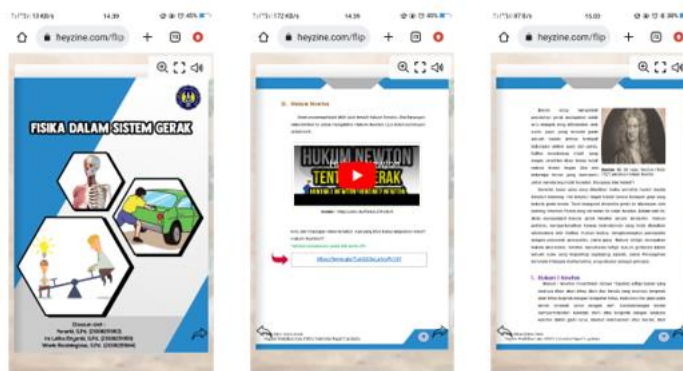
students in the X grade who are taking physics. Another analysis shows that most students have smartphones used as learning resources, and teachers permit students to use a smartphone when learning. Based on this analysis, learning media digital-based is suited to develop as a mobile app Android-based. All of the results in the define stage become the basis for developing an e-module Android-based as learning media in Newton's law.

The second stage in developing an Android-based e-module is design. This stage is app design, so produce e-modules prototype. They are developing e-modules using development software kvisoft flipbook maker 4. This app is chosen as development software because it's easy, cheap and can be used offline. The development of an app Android-based used the Kvisoft flipbook maker many have been done, such as (Permata & Safitiri, 2021; Wijaya, 2021). Kvisoft flipbook maker application-assisted e-modules get positive assessments because students easily understand the learning materials (Wijaya et al., 2021). Hence, the Kvisoft flipbook maker is suitable for used software development in e-modules development.

The drafting process of e-modules begins with drafting the storyboard based on define analysis, then adding pictures, video, and animations to produce the e-modules prototype. E-modules contain learning material about Newton's law equipped with pictures, animations and video support, questions, tests, and info about Newton's law today. The results of this design stage are e-modules prototypes in Apk format and ready to install on Android-based devices.

The third stage in developing e-modules develop. The developing e-modules Android-based apply the principle of being easily accessible, effective, interesting and relevant to their function. To fulfil this purpose, the e-module prototype validity test was conducted by two expert judgments: content and media. Expert validation assessment includes relevance, consistency, practice, design, language and usefulness. These aspects were developed based on the criteria Nieveen & Folmer (2013) proposed. The validity test used a validation questionnaire instrument containing 42 statements. The results of this validity show the feasibility of e-module Android-based development.

The product being developed is an Electronic Module (E-Module) in the form of a website link that can be used on smartphones, computers, laptops, and tablets. E-Modules are presented in the form of learning materials equipped with pictures, videos, assignments and available links to work on these assignments. Pictures and videos are presented to attract students' attention so that they better understand the material presented, fostering students' interest and motivation in learning. E-modules are packaged like manual teaching materials but presented in electronic form, which contains several materials, pictures and videos. The E-module also has buttons like page navigation, zoom, sound, and fullscreen. The developed e-module contains covers, prefaces, table of contents, module instructions, concept maps, introductory materials, subject matter, question boxes, learning objectives, supporting material images, videos, assignments, assignment answer sheets, and a bibliography. The display of the E-module can be seen in Figure 1.



**Figure 1.** Image of Contents Page of E-Module

### **Feasibility of developing an Android-based e-module in Newton's law**

The validity results show that content judgement obtained an average validity of 94.86% with a very good category, and the average percentage of validation results according to media judgement was 90.8% with a very valid category. Based results of content judgement validation, the developed e-module is feasible to use based on indicators of relevance, accuracy, completeness of presentation,

presentation system, and suitability of presentation. The material presented in the e-module follows the criteria for relevance and suitability of presentation because the material compiled, phenomena and examples presented, and the practice questions have been adjusted to students' competence in curriculum and Newton's law material learning objectives. Materials prepared following learning objectives make it easier for students to learn and achieve mastery in learning. E-module developed has 100% material accuracy criteria, which means the material presented under the development of science, daily life, and learning procedures is presented coherently and correctly.

In terms of completeness and systematic aspect of the presentation, the e-module developed has completely presented Newton's Law material in a comprehensive and logical, systematic and communicative manner described so it can lead and condition the improvement of students' learning experience. In addition, interesting presentation techniques and methods in e-modules can encourage students' willingness to learn (Lao et al., 2021). The material in the e-module has been arranged following the criteria for conformity with the presentation with student-centred learning outcomes in the form of general concepts that can be developed by students themselves through investigations in solving problems, especially in Newton's law material so students can build their knowledge without depending on the material provided in the e-module. This is following the results of research conducted by (Margunayasa et al., 2019) that learning science by actively involving students in the learning process through their findings can effectively easily understand the material being studied.

Based on the results of expert validation, the developed e-module media is also said to be suitable for use as teaching materials on Newton's Law based on validity indicators. There is the way of presentation, language suitability, module size, module cover design, and module content design. In terms of the way of presentation, the developed Android-based e-module has met the rules of finding good construction aspects with a contextual style relevant to the material raised in Newton's law, including aspects of material updating (Subali, 2018). Judging from the presentation and language suitability, e-module developed has used the correct diction, spelling, and terms according to the correct and correct language rules. This is in line with Subali (2018), which states that in developing teaching material, one should use standard language following general guidelines for good and correct language spelling, including in writing foreign language absorption words. From the aspect of module size, the cover design and content of the developed e-module contains the right proportions with easy-to-read font size and type. E-module cover design also has consistent rhythm and unity regarding the front, and back covers with colors that are in harmony with the material raised. In the aspect of e-module content design, layout consistency, completeness of elements, and typography of content are clear, making it easier for students to understand it. In general, e-modules that have been compiled have been attractive both in terms of cover and content, so the validation results show a high value with a correct category. This follows (Chrisyarani & Yasa, 2018). Acquiring the validity percentage can determine a very good category in the media aspect because it is arranged with colour combinations and harmony, the writing layout is interesting and not monotonous, and some pictures support the material.

The results of comments and suggestions from material expert validators and media experts on e-module improvements can be seen in Table 7.

**Table 7.** Comments and suggestions from validators

| <b>Validator</b>           | <b>Comments and Suggestions</b>  |
|----------------------------|--|
| Material Expert Validation | The material presented in the Android-based e-module is clear<br>Android-based e-module that has been developed is good.<br>Android-based e-module developed is very interesting and worth using.<br>The presentation of material in the e-module is very clear, accompanied by interesting pictures and videos.<br>There are some pictures in the e-module which are too small. |
| Expert Validation          | In the e-module, I am adding the author's profile after the bibliography is better.<br>Video presentations with English back sound in e-module should be muted or added with an Indonesian language introduction so students can better understand the video presented   |

Based on Table 7 shows that, in general, the material presented in the e-module is very clear and complete, easy to understand, accompanied by illustrations and examples that follow Newton's law

material. Then some suggestions or inputs from the validator that are constructive or correct are used to fill in the developed e-modules. Hence, e-modules can become appropriate teaching materials so e-modules can transmit messages and stimulate thinking, attention, motivation and interest in learning (Amaringga et al., 2021), especially in physics subject matter Newton's law.

The last stage is testing the Android-based e-module on a small scale to determine its practicality. Teaching materials are given to students via Google Drive, accessed by downloading them first, and student response questionnaires are distributed using Google Forms.

### The practicality of developing an Android-based e-module in Newton's law

The test results will be analyzed and interpreted based on the criteria according to the percentage of results obtained. In the research and development of flip book teaching materials, the dissemination stage was not carried out with the consideration of the limited ability of researchers to disseminate. The result of the practicality of the product can be seen in Figure 2.

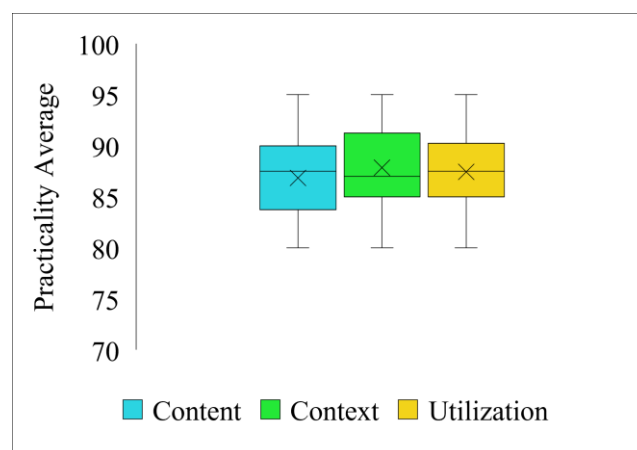


Figure 2. The practicality of Android-based e-module

Results of the product practicality test-based testing results on students in Figure 1 show a percentage of 100%, which means that the e-module developed is practical to be used as teaching materials for Newton's law based on the practical aspects of content and context. Practicality refers to the appearance and legibility of the developed e-module so it can be used easily by teachers and students. Based on the results of feasibility and practicality, it is hoped that the e-module developed can improve student learning outcomes following the expected competencies (Fradisa & Kartika, 2019).

The advantages of this Android-based Kvisoft Flipbook learning media are that it makes the teaching and learning process easier for both students and the teacher, saving students costs with Android, no longer need to use textbooks and can be used anywhere and anytime. In addition to the advantages of this learning media, there are also disadvantages, namely having to use software such as Android, making it difficult for students who do not have Android, the process is long if the network is disrupted and can harm the eyes if you often read using Android. In addition, judging from the physical form of the media, it certainly differs greatly from the media being developed now. The previous media developed a digital book form with the addition of several computer-based images, while the media being developed is now more sophisticated and more interesting because apart from being based on Android, there are also additional images and videos in several sub-chapters as a complement and explanation of the material so that students can more easily understand the material. Educators teach them.

The last stage of 4D development is disseminated by applying an Android-based e-module in the learning process. E-module Android-based application in physics learning on Newton's law topic held online in February. The product trial phase was carried out online by involving 50 students.

### Effectively developing Android-based e-module in Newton's law

Results of the field test phase are in the form of analysis of pretest, post-test, and learning outcomes using the e-module. The beginning of the meeting was done by giving pretest questions. The pretest and post-test recapitulation data of students can be seen in Figure 3.



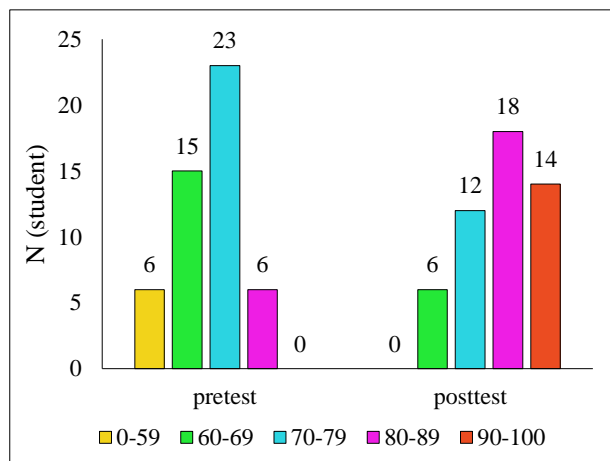


Figure 3. Product trial results in the recapitulation

Figure 3 shows increased students' learning outcomes before using e-modules and after using e-modules and the number of student achievements. Furthermore, the effectiveness assessment was measured using N-Gain based on average pretest and post-test values based on Table 8.

Table 8. Recapitulation of the average pretest posttest

| Pretest averages | Post-test averages | N-gain | Category |
|------------------|--------------------|--------|----------|
| 49.176           | 82.028             | 1.877  | High     |

Results of N-gain 1.877 in the high category indicate that using e-module in learning positively affects students' learning outcomes. Because the material is easy to understand with relevant learning media equipped with pictures, video and animation make students easy to follow and increase their knowledge. Further data analysis was carried out on student learning outcomes using a paired sample t-test to ensure the product's effectiveness—results of data using the statistical software are shown in Table 9.

Table 9. Statistics test

| Variable               | Score  |
|------------------------|--------|
| Z                      | -4.027 |
| Asymp. Sig. (2-tailed) | 0.000  |

Statistical test results show a significant difference between the pretest and post-test values with a Z value of -4.027 (based on negative rank) and a p-value of 0.000. So, it can be concluded that there is a significant increase in student value before and after learning using e-module Android-based. These results by Afifah et al. (2018) and Ilmi et al. (2021) showed that e-module-based android is effectively used as learning media to send messages to students through relevant learning media.

### Discussion

Information and telecommunications technology (ICT) progress towards the all-digital direction has grown rapidly. The use of the internet and smartphones are still evidence of these developments. Smartphones cannot be separated from the support of the internet network. According various surveys, one of which is by the Association of Indonesian Internet Network Providers, 2020 shows that as many as 73.7% of students in Indonesia use the Internet (APJII, 2020). This survey is reinforced by the needs analysis results, which state that 95.4% of the sample uses the Internet daily to seek information about lessons and school assignments. Based on the survey results, it is necessary to absorb various advantages of computer technology to develop learning media (APJII, 2020). In addition, the world is currently experiencing a disaster, namely the COVID-19 pandemic. Millions of people worldwide have been exposed, and even thousands of people have died due to the virus. The shift in the way of online learning forces teachers or lecturers to follow paths that can be used so that learning can take place. Thus, digital technology supports the development of learning materials that can be utilized in various conditions (Kurniawati & Wijastuti, 2021).



The product in this study is an Android-based e-module. E-modules are modules that are digitally manipulated to become interactive multimedia, including adding text, moving animations, videos, and website links, and equipped with instructions so that they are suitable for use in the learning process. E-modules have many advantages when compared to print modules: (1) e-modules can be taken anywhere so that they can be used anywhere (2) e-modules can provide various systematic, interesting and high-quality explanations, (3) through e-modules, student learning is no longer dependent on teachers/educators. as the only source of information (Astalini et al., 2021).

The development of teaching materials in the form of Android-based e-modules is carried out as a solution to learning problems in the era of society 5.0 with the application of digital-based learning media. Teaching materials in e-modules can effectively improve learning outcomes by providing opportunities for students to understand the material being taught (Sumarmi et al., 2021). In addition, developing Android-based e-modules can provide quality learning services effectively and efficiently (Pahuriray, 2021). This aligns with the statement by Handaru (2020) that Android-based learning media will make it easier for students to participate in learning. Using smartphones is special learning because students can access learning materials that are more active and not bound by place and time (Zulfiani et al., 2021), as it has known that society 5.0 era puts forward technology as the main communication medium in all fields (Yamada, 2021). Therefore, the development of an Android-based e-module is research that supports the presence of the era of Society 5.0, especially in the world of education. Rachmawati et al. (2021) states that the quality of education will be better if the applied education system is able to adapt to the demands and developments of the times. In the future, it is hoped that there will be more research that can develop teaching materials or digital-based learning media in supporting the presence of the society 5.0 era by prioritizing the Internet of Things (IoT) in more specific subjects or subject matter.

## CONCLUSIONS

Based on the results of the analysis and discussion of products that have been developed, the Android-based e-module has met the feasibility and practicality aspects as teaching materials based on feasibility and practicality indicators that material expert validators and media experts have validated. The results of feasibility analysis show a percentage of 94.86% based on material expert validation and 90.8% percentage based on media expert validation covering aspects of relevance, accuracy, completeness of the presentation, systematic presentation, and suitability of the presentation, which means that the Android-based e-module developed meets the feasibility aspect as teaching material on Newton's law. The results of the practicality analysis show a percentage of 100% based on test results in content and context, which means that the Android-based e-module developed fulfils the practicality aspect as teaching material in Newton's Law. The analysis results on the effective use of e-modules show N-gain 1,877 in the high category, which means that e-module developed is effective use as learning media in Newton's law material. This study succeeded in analyzing the feasibility and practicality of an Android-based e-module developed on Newton's law material, so it can be considered applied in large-scale trials to improve students' skills in Newton's Law material.

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E-module link :

<https://heyzine.com/flip-book/dc89c06515.html>