

# Development of Integrated Android Physical Flipbook with Pancasila Values on Newton's Law Material

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## Abstract

Pancasila is the basis of the state and ideology of the Indonesian nation. However, the practice of Pancasila values as the character of the Indonesian nation in everyday life has decreased. Therefore, it is important to integrate Pancasila into learning a strengthen student character education. The study aims to (1) develop an integrated android physics flipbook product with Pancasila values in Newton's Law material and (2) determine the feasibility of the product being developed. This research is development research. The development model used is the 4D model (define, design, develop, and disseminate). The development is carried out by involving a material expert, a media expert, two teachers, and a colleague. The product trial stage was carried out by involving 36 students of class XI MIA 1 SMA Negeri 1 Prambanan Klaten. Data analysis used quantitative analysis with descriptive statistics. This study shows that the Flipbook media developed has the advantage of Newton's Law material which is integrated with Pancasila values, has a media aspect assessment score of 3.93 with a very good category, material aspect of 3.89 with a very good category, and student responses during trials. of 3.34 with good category. Furthermore, teachers or other researchers can develop learning media that are integrated with Pancasila values for other physics materials.

**Keywords:** android, development, flipbook, pancasila values, newton's law

## INTRODUCTION

The low quality of education in Indonesia is still of particular concern. This can be seen from the low scores in the national examinations held by the government. Regulation of the Minister of Education and Culture No. 3 of 2017 article 1 paragraph 4 which regulates the assessment of learning outcomes by the government, establishes a national exam as a measuring tool for the achievement of competency in passing students which refers to the competency standards of graduates. Based on the UN results for the last 4 years in the academic year 2014/2015 to 2017/2018, it shows that the results of physics subjects are in the poor category. Based on these data, the percentage of students who answered

correctly on Newton's Law material in the last 4 years in a row were 53.70%, 60.30%, 42.35%, and 42.93%. In the last two years, there has been a decrease in the percentage of students who answered correctly on Newton's Law. The low score can be caused by the fact that some questions have high standards that require reasoning and HOTS. However, there are studies that show HOTS 'ability to think critically of students is still low (Nisa, Koestiari, Habibullah, & Jatmiko, 2018). Indonesian students show poor performance in the assessment of the field of science at national and international levels (Martin, 2019). In addition, students also have difficulty understanding the material concept of Newton's Law (Erfan & Ratu, 2018).

In the 2013 curriculum, Newton's Law material is studied in class X. Newton's Law material is an essential material in Physics subjects related to activities and phenomena of everyday life. Several studies have shown that Newton's Law material is studied based on everyday life such as the traditional potlele game (Garung & Supahar, 2019) and the game Pacu Jalur to Riau's local wisdom (Mutammimah & Rosana, 2019). Newton's Law material is studied with a conceptual framework model developed with the integration of knowledge (Bao & Fritchman, 2021). Based on this, Newton's Law material was chosen to be integrated with Pancasila which is a guideline for daily life in Indonesian society (Susanto, 2016).

Education is not only a knowledge transfer process but also a value transfer process. The balance between knowledge and character values will produce an expert figure who has a good soul and sense in carrying out every mandate that is mandated (Susilo, Dewantoro, & Yuningsih, 2022). Learning with practice and understanding science concepts in everyday life can foster a sense of the environment so that students are able to shape students' character better (Sarwi, Sutardi, & Prayitno, 2016). Strengthening character education should be done by applying the values contained in Pancasila. Pancasila has been the guideline and ideology of the Indonesian nation from generation to generation from the independence era to the present. Pancasila cannot be replaced by other ideologies, because Pancasila is an ideology that comes from the roots of life or the original character of the Indonesian people. Over time, the values of Pancasila which were contained were eroded little by little. This happens because of the development of the life of the global community which has been dominated by the life of the western world. Several studies have shown that the practice of Pancasila values as the character of the Indonesian nation in everyday life has decreased (Yudhanegara, 2015; Buchory, 2017; Sumardjoko, 2018).

Learning that integrates Pancasila is very important to implement, considering that many phenomena of Pancasila values are starting to

fade. Pancasila contains values that guide the attitude of the Indonesian nation. Values contained in Pancasila such as divinity, humanity, unity, democracy, and justice. Several studies have shown that Pancasila education can increase the values of attitudes such as honesty (Nurgiansah, 2021), tolerance (Yani, 2020), social care (Aulia, 2021), and religious (Nurgiansah, 2022). Learning with a model that focuses on the integration of Pancasila values is able to instill an attitude of honesty, mutual cooperation, humanity, a sense of kinship, cooperation, and an attitude of justice in students (Nor, Djatmika, Widjaja, & Wahyono, 2022). This is in line with the learning objectives which are not only in the cognitive but also in affective aspects.

Pancasila is the basis of the Indonesian state which has five principles that accommodate the spirit of diversity and humanity. However, what is happening in Indonesia still cannot be separated from SARA problems and conflicts (Dewantara, 2015). Pancasila should be a middle ground for both liberals and socialists, charting a new path for philosophy and politics, but the many problems have made it a meaningless collection of terms (Iskandar, 2016). Students' understanding of Pancasila is reduced, some even do not memorize the principles (Riyanti & Prasetyo, 2019). Pancasila values can be integrated into Physics learning resources to have a good influence on students' critical thinking skills (Arifin, Wilujeng, & Jumadi, 2020). However, based on interviews with physics subject teachers at SMAN 1 Prambanan, they have never integrated Pancasila with the material being taught. In learning activities not all teachers are able to integrate material with Pancasila values (Murdiono, Miftahudin, & Wulandari, 2017).

Along with the development of the era of delivery of learning materials assisted by technology (Suseno & Riswanto, 2017). Mobile learning is evidence of the use of technology in learning. Mobile learning with Android media improves the academic performance of students (Yektyastuti & Ikhsan, 2016). Wu & Perng's (2016) research results show higher learning outcomes after mobile learning. This is because mobile

learning reduces text descriptions and increases animation that allows students to interpret. Technology can also be an alternative for schools that have limited practical tools and can support learning without time and space constraints (Irvani & Warliani, 2022). However, mobile learning at SMAN 1 Prambanan is not optimal. Based on an interview with the Physics subject teacher at SMAN 1 Prambanan, they have used a smartphone in learning, but it is only limited to looking for practice questions and doing them.

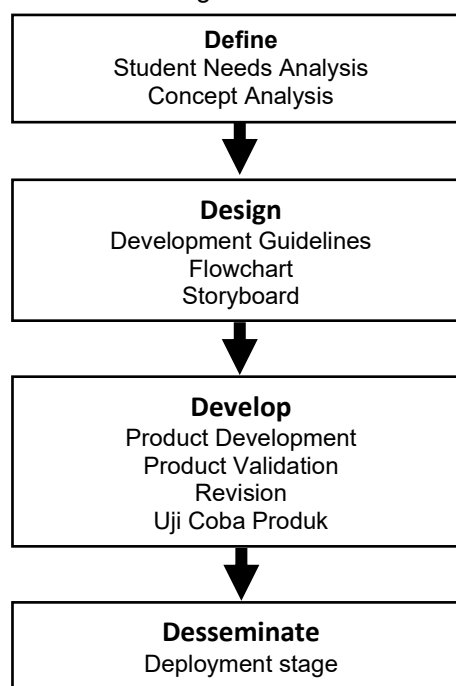
Learning media, namely all the tools used in conveying the content of learning material. The examples of learning media are pictures, audio, video, films, books, handouts, television, and computers (Taufiq, Dewi, & Widiyatmoko, 2014). Electronic books or E-books make it easier for students to understand and visualize physical processes (Suyatna, Maulina, Rakhmawati, & Khasanah, 2018). In recent years (2015-2019), E-Books are used in various levels of education and adopted in more diverse learning contexts (Tang, 2021). Electronic books provide solutions to anticipate expensive textbooks and reduce deforestation as a raw material for paper. There are many benefits of E-books in learning, but they are not in line with their not optimal use (Ghofur & Kustijono, 2015). Interactive features in E-Books need to be well designed to help students understand (Lim, Whitehead, & Choi, 2021). SMAN 1 Prambanan itself still has not used E-books in learning Physics.

Based on the facts that have been stated, it can be concluded that there is an opportunity to integrate Pancasila values into Newton's Law material. The practice of Pancasila values as the character of the Indonesian nation in everyday life is felt to be decreasing, so it is necessary to integrate Pancasila values in learning in schools. Electronic books have many advantages as learning media which are expected to present Newton's law material and Pancasila values in an interesting way. The combination of Android E-Book technology and the integration of Pancasila values in Newton's Law material is a novelty point in this research. Therefore, the purpose of this research is to develop learning media in the form

of Flipbooks that can facilitate the integration of Pancasila values into Newton's Law material. Through this development research, it is hoped that Flipbook products can be used as learning media and can be an innovation to strengthen character education in schools by integrating Pancasila values into physics learning materials.

## METHOD

The method used in this research is the method of research and development (Thiagarajan, 1974: 5). This 4-D model consists of 4 stages, namely: Define, Design, Develop, Disseminate. These methods and models were chosen with the aim of developing an integrated multimedia flipbook with Pancasila values in Newton's Law material. The development procedure shown in Figure 1.



**Figure 1.** Product Development Procedure

The definition stage is used in defining and determining the needs in the learning process as well as collecting information related to products in the form of Flipbooks integrated with Pancasila values. Preliminary studies carried out include identifying problems in learning physics, interviews with teachers, class observations, and literature

studies so as to assist in the development of an integrated Flipbook with Pancasila values that suit the needs of students. The analysis that will be carried out includes the analysis of facts, concepts, principles, and theories of physics contained in the material.

At the design stage, a product design is made from the results of the analysis in the previous stage. The outputs at this stage are development guidelines, flowcharts, and storyboards. Flipbook preparation is done through the initial design in the form of a storyboard. Storyboard is an overview of the overall learning Flipbook that will be created. The storyboard serves as a guide to facilitate the process of making learning flipbooks.

The development stage is the stage to develop Flipbook which refers to the storyboard that has been made in the previous stage. At this stage, product development results, product feasibility assessments, and product trial data are obtained. Products that have received expert assessments are then repaired according to the input provided.

The dissemination stage is the last stage in this research. Furthermore, the product will be disseminated in the form of an application. The dissemination process is carried out by making scientific journals, disseminating it through teachers, and high school students of class X MIPA.

The research was conducted at SMA Negeri 1 Prambanan. The class used in this research is class XI MIA 1. The number of respondents in the product trial was 36 students. The data collection instrument consisted of product assessment sheets and student response questionnaires. The product appraisal sheet is used to assess the feasibility of the material and media on the product that has been developed. Aspects and indicators of the product assessment questionnaire are presented in Table 1 and Table 2. Student response questionnaires consist of aspects of appearance, material, operation, and benefits.

**Table 1.** Aspects of Media Assessment

Aspect	Sub Aspects
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Audio display	visual	Complete identity Suitability of layout proportions Color proportion suitability Audio compatibility Font selection suitability Consistency of button appearance Clarity of media usage
Software engineering		Ease of access Creativity and innovation Media development opportunities for the development of science and technology

**Table 2.** Aspects of Material Assessment

Aspect	Sub Aspect
Learning	Suitability of indicators with KI KD The suitability of the indicator with the material The suitability of the integration of Pancasila values with learning materials
Theory	Clarity of the concept of material that is integrated with the values of Pancasila The conciseness of the explanation of the material The attractiveness of the material presented and develop critical thinking skills and an attitude of responsibility The relationship between the material presented in the form of animation and narrative with the values of Pancasila The suitability of writing evaluation questions formulation The suitability of the answer key with the evaluation questions
Language	Correct use of symbols, equations, and physical units Accurate use of language The accuracy of choosing the sentences used

Physics is a science that studies natural phenomena. One of the physics materials studied in high school is Newton's Laws of Motion. Newton's Law material is very easy to apply in everyday life. Therefore, Newton's Law material will be easily integrated with the values of Pancasila. The integration of Pancasila values is shown in Table 3.

**Table 3.** Integration of Pancasila values into Newton's law material

Material	Pancasila Values
Newton's First	Fear of God Almighty

Law	Like to work hard
Newton's Second Law	Develop an attitude of tolerance Develop a sense of love for the homeland
Newton's Third Law	Carry out activities in order to realize equitable progress and social justice Decisions taken must be morally accountable to God Almighty
Kind of Force	Fear of God Almighty Recognizing the equality, rights, and obligations of every human being Promote association for the sake of national unity and integrity

In the questionnaire, the results of the assessment of the device and the responses of students were analyzed using descriptive analysis. The data in the form of Likert questions were then changed into quantitative form. The data that has been converted are then classified into groups of actual scores which state the feasibility level of the product to be developed. Widoyoko (2011) makes a classification by comparison of the average ideal score ( $X_i$ ) and the ideal standard deviation score ( $S_{Bi}$ ), the qualification level is divided into four categories, with the criteria as in Table 4.

**Table 4.** Convert Scores into Categories

Average Score Range	Categories
$X > X_i + 1,8 S_{Bi}$	Very Good
$X_i + 0,6 S_{Bi} < X \leq X_i + 1,8 S_{Bi}$	Good
$X_i - 0,6 S_{Bi} < X \leq X_i + 0,6 S_{Bi}$	Enough
$X_i - 1,8 S_{Bi} < X \leq X_i - 0,6 S_{Bi}$	Bad
$X \leq X_i - 1,8 S_{Bi}$	Very Bad

The average ideal score ( $X_i$ ) and ideal standard deviation ( $S_{Bi}$ ) can be determined by the following formula:

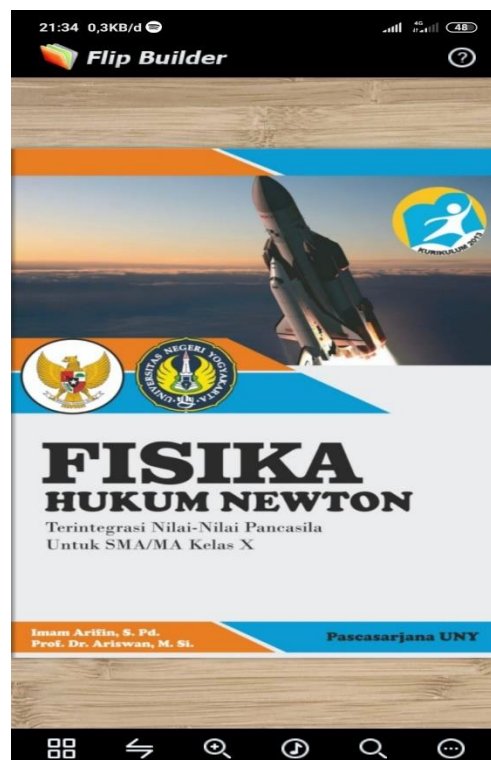
$$X_i = \frac{Skor\ max\ ideal + Skor\ min\ ideal}{2} \quad (1)$$

$$S_{Bi} = \frac{Skor\ max\ ideal - Skor\ min\ ideal}{6} \quad (2)$$

## RESULT AND DISCUSSION

This development research went through four stages, namely define, design, develop, and disseminate (Thiagarajan, 1974: 5). The final

product of this development research is Newton's Law Flipbook which is integrated with the values of Pancasila. Flipbook products are developed, assessed by experts and practitioners in their fields, and carried out trials in learning activities. Pancasila is integrated both in Flipbook display and in Newton's Law material content. The cover of the book which is integrated with Pancasila values can be seen in Figure 2.



**Figure 2.** Cover page

Based on Figure 2, it can be seen the integration of Pancasila both in terms of appearance and material. In terms of appearance, integration can be seen in several logos such as Garuda on the cover page. Integrating Pancasila values into Newton's Law material is also seen in the title of the e-book that is displayed. Furthermore, there is a guide page for the practice of Pancasila values shown in Figure 3.

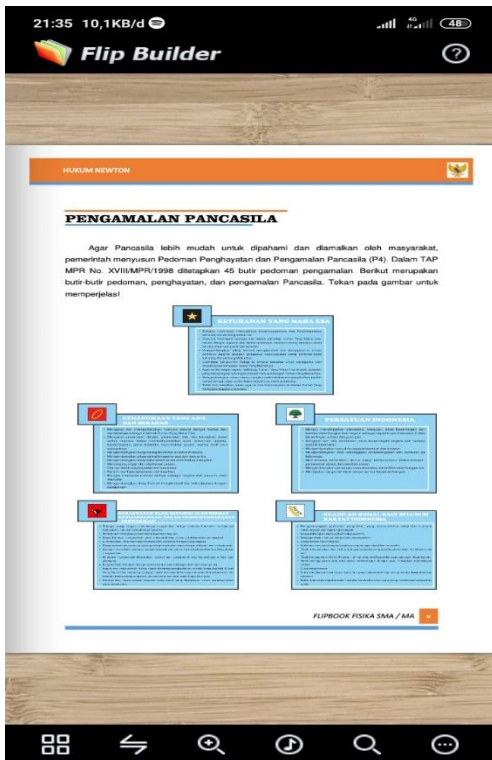


Figure 3. Guidelines for the Practice of Pancasila

Figure 3 shows 45 guidelines for understanding and practicing Pancasila. Guidelines for the appreciation and practice of Pancasila is a guide to the practice of Pancasila in the life of the state. This page also displays symbols related to the Garuda Pancasila symbol. The star is the first precept symbol that describes a light, such as a spiritual light that comes from God to every human being. The chain in the symbol of the second precept consists of a chain in the form of a quadrangle and a circle that is interconnected to form a circle. The banyan tree is a large tree that many people can use as shelter under it. The head of the Banteng has a philosophy of being a social animal that likes to gather, such as musyawarah, where people discuss to make a decision. The symbol of rice and cotton is a symbol of food and clothing which implies that the main condition for a just state is that it can achieve prosperity for its people equally. The integration of Pancasila values on the material page is shown in Figure 4.

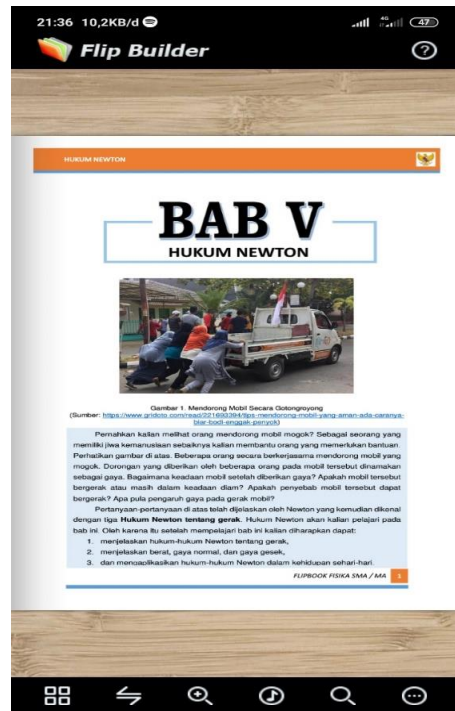
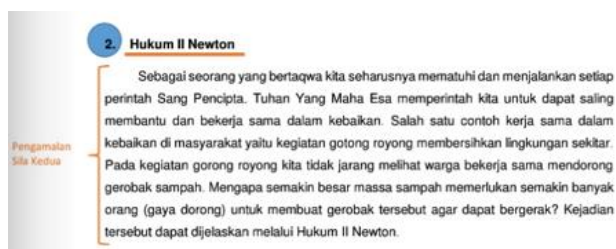


Figure 4. Material Pages

The integration of Pancasila values in the developed e-book can be seen in the material, sample questions, practice questions, character boxes, and a glossary. Some of the pictures and videos in the Flipbook depict Pancasila practice activities such as working together when pushing a car (Figure 4). The background used in the Flipbook is the Garuda Pancasila song. In terms of material integration, it can be seen such as the value of responsibility which is integrated with Newton's third law material and the value of love for the homeland with Newton's second law. Arifin, Wilujeng, and Jumadi (2020) research support that the use of physics books integrated with Pancasila has a good impact on students' abilities.

An example of the integration of Pancasila values into Newton's Law material can be seen in Figure 5. In the book, Newton's Second Law is presented about pushing a cart in mutual cooperation. Students are invited to analyze according to Newton's second law. In addition, gotong royong is also included in the practice of the second principle of Pancasila. The integration is shown in Figure 5.





**Figure 5.** Integration of Pancasila in Newton's Second Law Material

The product developed is assessed by experts from the media and material aspects. Flipbooks that have been developed are evaluated by experts. Assessments were given to one material expert lecturer, one media expert lecturer, three physics teachers, and one physics colleague. Some of the features that have appeared in the pictures are in accordance with research from Lim, Whitehead, & Choi (2021) which states that interactive features in E-Books can help students understand the material.

**Table 5.** Assessment Results

Type of Assessment	Aspect	Score
Media Assessment	Audio and visual display	3.9
	Software engineering	4.0
Average media aspects		3.9
Material Assessment	Learning	3.8
	Material	3.9
	Language	4.0
Average material aspects		3.9

Table 5 shows the results of the assessment by experts. Expert assessment on the media aspect obtained a large average score of 3.9 which is included in the very good category. In the material aspect, the expert gave an average score of 3.9 with a very good category. Based on the assessment of experts, it shows that Newton's law material can be integrated with Pancasila and the results are in accordance with previous research (Fatkhurrohman & Kusuma, 2019; Himawan & Ariswan, 2020; Sari, Wilujeng, & Satriana, 2020).

There are suggestions for improvement by experts, namely, among others: (1) the E-book

cover needs to include a supervisor; (2) basic competence analysis should also analyze indicators; (3) an example of Newton's Law (Bull Racing) will be more clearly inserted into the video; (4) redaction improvements to the explanation of decisions along with Newton's Third Law; (5) Pancasila values need to be emphasized in a visible manner; (6) the glossary is added with the meaning of Pancasila values that are relevant to the material; (7) it is necessary to consider the existence of the UNY logo; (8) example questions if there is only one there is no need for numbering.

The flipbook which was revised according to the advice of the experts was tested. The trial was carried out to obtain student responses related to the flipbook that had been developed. The limited trial was carried out in class XI MIA 1 with a total of 36 students. The results of students' responses in the form of flipbook readability can be seen in Table 6.

**Table 6.** Student Response Results

Aspect	Score	Criteria
Display	3.3	Good
Presentation of material	3.5	Very Good
Operation of the media	3.3	Good
Benefits of media	3.2	Good
Average	3.3	Good

Based on Table 6, students respond to aspects of the display, presentation of material, operation of the media, and benefits of media. The results of the students' responses got an average score of 3.3 with a good category. Students are interested in Newton's law material which is presented in the problems of everyday life as well as the value of practicing Pancasila. The results of the responses of students obtained are in accordance with previous research (Fatkhurrohman & Kusuma, 2019; Himawan & Ariswan, 2020; Sari, Wilujeng, & Satriana, 2020).

The dissemination stage is the last stage in this research. The product has been revised according to the shortcomings when operating the Flipbook in trials after using the Flipbook.

Furthermore, the product will be disseminated in the form of an application. The dissemination process is carried out by making scientific journals, disseminating them through teachers, and high school students of class X MIPA.

## CONCLUSION

In accordance with the objectives of this study, it can be concluded that (1) the product developed in the form of an integrated physics flipbook with Pancasila values is suitable for use in learning. Pancasila integration in book products that have been developed in the form of images, symbols, background audio, Pancasila practice guide pages, Newton's law materials presented in contextual problems, character corners, and terms in the glossary. (2) The assessment on the media aspect is 3.93 in the very good category and the material aspect is 3.89 in the very good category. Student responses during the limited trial scored 3.34 in the good category.

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