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Development of Physics E-Books Assisted by Flipbook and Augmented Reality (AR) to Increase Learning Motivation of High School Students

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ABSTRACT .
The initial observation results indicate that students are less active in the learning process and easily give up when faced with tasks deemed difficult. This study aims to describe the feasibility of physics e-books aided by flipbooks and augmented reality (AR), describe students' responses and describe students' learning motivation after the implementation of physics e-books aided by flipbooks and augmented reality (AR). This research is a type of development research using the ADDIE model. Sampling was done using purposive sampling techniques consisting of students from the Eleventh-grade science 3 class at Public High School 7 in Kota Bengkulu. The instruments used were observation sheets, teacher interview sheets, validation sheets, student response questionnaires, and pretest and posttest student learning motivation questionnaires, with data collection techniques including interviews, questionnaires, and documentation. Data were analyzed using quantitative data analysis. The research results show that the feasibility test criteria for physics e-books were obtained with a very good category. Students also responded very well to the developed physics e-books. Based on the analysis of student learning motivation questionnaires using the Gain value, it was found that students experienced an increase in learning motivation after using the developed physics e-books. Therefore, it can be concluded that physics e-books aided by flipbooks and augmented reality (AR) are highly suitable for use as learning media and can enhance students' learning motivation, especially in dynamic fluid materials.

INTRODUCTION

Education in the 21st century, propelled by the rapid development of technology, is increasingly required to be more advanced and accessible to everyone (Nopilda & Kristiawan, 2018). One of them is the Industrial Revolution 4.0 or the digital era. The Industrial Revolution 4.0, characterized by education, utilizes digital technology (cyber system) in learning (Surani, 2019). Physics learning is one of the learning processes that has an essential role in supporting science and technology. This can be seen from the application of physics and other sciences, and its application to technological development (Karisma, 2016). One of the implications of technological advancements is the expectation for teachers to create diverse learning materials to enhance students' engagement in learning. This is essential as learning media plays a significant role in the overall learning process. The position of learning media is a medium for delivering learning messages that must still be

controlled, manipulated, and accountable in the hands of a teacher, especially in achieving the desired learning objectives (Ramli, 2012).

Teachers in carrying out learning activities are also required to make the media produced effective, innovative, and interesting, so that students can be interested in following the learning delivered (Faqih, 2021). The high school curriculum in use is the 2013 curriculum, which emphasizes student-centered learning and requires students to actively participate in the learning process (Hamid et al., 2023). Books are an essential medium in the learning process. Therefore, currently used textbooks must continue to innovate to keep up with the times and facilitate students' learning. For example, in physics lessons, dominant printed physics books are thick and heavy and cannot be used by students anytime and anywhere in other words, the learning media is less practical (Musdalifa, 2021).

E-books are one of the innovations in the fulfillment of technology-based educational facilities and infrastructure in the digital era, and the presence of e-books can increase students' interest in books. In addition, using gadgets is very common among students, so e-books will give a new impression and are not outdated (Afifah & Mulyani, 2022). In addition to learning media, one of the fundamental factors contributing to the attainment of learning objectives is motivation for learning. According to research by Sari et al. (2018), students' motivation for physics learning falls within the medium and low categories, primarily due to a lack of interest among students in learning physics. According to Sulistyorini (2012), learning motivation refers to the overarching impetus within an individual, including students, which initiates learning activities and guides them toward achieving desired goals. It is crucial in igniting passion and enthusiasm for learning, facilitating the learning process. It is an absolute requirement for learning. Learning motivation has a big role in student success, the effectiveness of learning outcomes is directly influenced by the quality of motivation provided. Therefore, the more suitable the motivation, the higher the likelihood of achieving favorable learning results. Consequently, motivation consistently dictates the effort students invest in their learning endeavors (Andriani & Rasto, 2019).

Student learning motivation can be measured using instruments developed based on aspects of learning motivation. Keller (1987) developed aspects used to measure the level of student learning motivation called ARCS (Attention, Relevance, Confidence, and Satisfaction), ARCS which was developed based on a synthesis of the concept of learning motivation and the characteristics of learning motivation, which are grouped into four aspects namely Attention, Relevance, Confidence, and Satisfactions (Sakahuni, 2020). Attention is the attitude of students when focusing on learning physics. Relevance is a student's view of the attachment between Physics material and students' daily conditions. Confidence is a student's confidence in learning or ability to solve physics problems. And satisfaction, namely a sense of satisfaction in students in solving the physics problems learned.

Based on preliminary observations at Public Senior High School 7 Bengkulu City through interviews with physical teachers, the same problem was found. It is known that students' motivation to learn in high school is still relatively low. This is characterized by students who are still less active in learning, students who easily give up when they cannot do tasks that are considered difficult, students who are not actively involved in giving opinions when discussing, and students who quickly feel bored with the learning that is done. Based on interviews, It was discovered that the three teachers at the school predominantly relied exclusively on learning materials in the form of printed books and worksheets. The analysis of students further corroborates this observation needs questionnaires, which indicated an average agreement rate of 74.59% among students for the development of physics e-books supplemented by flipbooks and augmented reality (AR).

Based on these problems, the solution is to develop technology-based learning media, one of which is physics e-book learning media assisted by flipbook and augmented reality (AR) to increase the learning motivation of high school students. The e-book developed is a flipbook or alternating digital book containing augmented reality (AR) technology, and the final result is published in HTML. The combination of flipbooks and augmented reality (AR) in physics e-books aims to make learning media more interesting. Each page is equipped with augmented reality (AR) that can be used directly without markers. Augmented reality (AR) technology is a two-dimensional or three-dimensional application that combines real and virtual objects and projects them in a real environment simultaneously (Afifah et al., 2019). Augmented Reality (AR) media can increase students' interest in

learning because the material presented is interactive and real. In addition, integrating Augmented Reality (AR) media into learning can stimulate students' attitudes toward problems and events they encounter (Mustaqim, 2016). In previous research, Gustian and Riyanto (2021) suggest that employing android-based e-books as a learning tool can elevate students' enthusiasm for studying physics. Furthermore, previous research and development with the title "E-book development using Kvisoft Flipbook Maker to improve learning outcomes on static fluid material" the study's findings indicated that the developed e-book was effectively utilized to enhance student learning outcomes (Sumarsono & Anggaryani, 2022).

In the study by Nurjanah et al. (2022), the utilization of e-books in learning has the potential to capture students' interest, motivation, and curiosity through the diverse features embedded within them. Based on the explanation above, the purpose of this study is to describe the feasibility and student response to the developed flipbook-assisted physics e-book and augmented reality (AR), as well as describe the increase in student learning motivation after using flipbook-assisted physics e-book and augmented reality (AR).

RESEARCH METHODS

Research Approach

The method employed in this research is Research and Development (R&D), also known as development research. This methodology is utilized to create specific products. This study's designed product is a physics e-book supported by flipbook and augmented reality (AR). The ADDIE development model, formulated by Dick and Carey (1996), is utilized as the guiding framework. The ADDIE model is versatile and can be applied to various forms of product development, including learning models, strategies, methods, media, and teaching materials (Rusmayana, 2021). The ADDIE model in this study is organized into five stages as follows.

1. The analysis stage, at this stage researchers conducted observations of physics teacher interviews and distributed questionnaires of student needs at Public Senior High School 7 Bengkulu City to identify problems faced by students and teachers.
2. The design stage, at this stage the e-book design is made according to the needs that have been analyzed at the previous stage.
3. In the development stage, the product manufacturing process is carried out following the design at the previous stage, after which expert validation is carried out with three validators using a validation questionnaire. Then, revisions are made according to the suggestions of the validators.
4. The implementation stage, at this stage, the product that has been revised and is suitable for use, is carried out in a small-scale trial to students of 11th-grade science 3 of Public Senior High School 7 Bengkulu City to determine student responses and determine the increase in student learning motivation after using physics e-books assisted by flipbooks and augmented reality (AR) using response questionnaires and student learning motivation questionnaires.
5. The evaluation stage assesses each step taken during the research at this stage.

Research Participants

This research was conducted at Public High School 7 Bengkulu City, and the research time was conducted in the odd semester. The sampling technique in this study used purposive sampling, which is a sampling technique that can represent the population as needed. With a sample taken, 37 students of 11th-grade Science 3 Public High School 7 Bengkulu City.

Research Instruments

The instruments used in this study are teacher interview observation sheets conducted with physics teachers, student needs questionnaires, media validation questionnaires consisting of 4 aspects of assessment, namely content, presentation, language, and media, student response questionnaires consisting of 3 aspects of assessment, namely appearance, presentation of material and benefits of physics e-books assisted by flipbooks and augmented reality (AR), pretest and posttest questionnaires of student learning motivation. According to Keller in (Lukman et al., 2021) Learning motivation can be seen from four components: Attention, Relevance, Confidence, and Satisfaction (ARCS). This

study measured learning motivation based on four motivation components: Attention, Relevance, Confidence, and Satisfaction.

Data Collection

Data collection in this study was carried out through interviews, questionnaires, and documentation. Data collection using teacher interview sheets is carried out to analyze the problems faced by teachers, student needs questionnaire sheets are carried out with the aim of knowing how much students need the e-book developed, validation questionnaire sheets are used to determine the feasibility of the e-book developed, response questionnaire sheets are used to find out student responses after using e-books, as well as pretest and posttest sheets of student learning motivation. The pretest questionnaire sheet on learning motivation was given to students before the trial of the developed media and the posttest sheet was given after the use of the developed media, this aims to determine the increase in learning motivation after and before the use of the developed media.

Data Analysis

The data analysis used in this study is quantitative data analysis derived from the results of questionnaires that have been distributed and data collected. In this study, the questionnaire used used a Likert scale such as table 1.

Table 1. Likert scale for each assessment

Criteria	Score
Strongly Agree	4
Agree	3
Disagree	2
Strongly Disagree	1

(Purwanto & Risdianto, 2022)

The data management of the questionnaire results is calculated using the equation used based on the questionnaire used, then the results are classified based on the interpretation of each questionnaire, while the questionnaire analysis in this study is:

1. Needs Questionnaire Analysis

The needs questionnaire was filled in by students consisting of student responses to physics learning, student needs for learning media to increase learning motivation, and student needs for physics e-books assisted by flipbooks and augmented reality (AR). The interpretation of the score on the student needs questionnaire is calculated using equation 1.

$$\%\, Score\ interpretation = \frac{\sum acquisition\ score}{\sum maximum\ score} x100 \qquad (1)$$

Table 2. Likert scale interpretation

Percentage %	Category
0% - 25 %	Strongly Disagree
26 % - 50 %	Disagree
51 % - 75 %	Agree
76 % - 100 %	Strongly Agree

(Purwanto & Risdianto, 2022)

2. Validation Questionnaire Analysis

The validation questionnaire analysis determines the feasibility of the developed product that the validator has assessed. to determine the percentage value of expert validation using equation 2.

$$Validation = \frac{total\ score}{total\ Maximum\ ideal\ score} x100\% \qquad (2)$$

Table 3. Criteria for validation results

Percentage %	Category
0% - 25 %	Very inappropriate
26 % - 50 %	Not feasible
51 % - 75 %	Feasible
76 % - 100 %	Very Feasible

(Siahaan et al., 2019)

3. Student Response Questionnaire Analysis

Analysis of student response data was conducted to see student responses to the use of learning media developed. Score interpretation was calculated using equation 3.

$$\%\ Score\ Interpretation = \frac{\sum acquisition\ score}{\sum maximum\ score} x100 \quad (3)$$

Table 4. Likert scale interpretation

Percentage %	Category
0% - 25 %	Very unfavorable
26 % - 50 %	Not Good
51 % - 75 %	Good
76 % - 100 %	Very Good

4. Analysis of Student Learning Motivation Questionnaire

The learning motivation questionnaire was conducted to determine the increase in student learning motivation after using the product. The student learning motivation questionnaire consists of pretest and posttest questionnaires. After the data is obtained, the average score obtained from all students is calculated. The value will be obtained using the Normalized Gain formula in equation 4.

$$N - Gain = \frac{Xpostest - Xpretest}{Xmaxsimum - Xpretest} \quad (4)$$

Table 5. N-Gain index criteria

N-Gain	Category
$0{,}70 < g \leq 1{,}00$	High
$0{,}30 < g \leq 0{,}70$	Medium
$0{,}00 < g \leq 0{,}30$	Low
G=00	No Improvement
$-1{,}00 \leq g < 0{,}00$	Decrease

(Silfiani et al., 2022)

RESULTS AND DISCUSSION

Results

The results of the research on the development of flipbook-assisted physics e-books and augmented reality (AR) are adjusted according to the steps of the ADDIE development model which consists of five stages of Analysis, Design, Development, Implementation and Evaluation, which are as follows:

1. Analysis Stage

The analysis stage is the first stage carried out by researchers. At this stage, researchers conducted observations of physics teacher interviews and distributed questionnaires on student needs at Public High School 7 Bengkulu City. Based on interviews with three physics teachers, information was obtained that student learning motivation at the high school was still relatively low. this is indicated by students who are still less active in learning, students do not do the assignments given by the teacher, students easily give up with tasks that are considered difficult given by the teacher, students

are not actively involved in discussions, and students quickly feel bored with the learning that is done, and based on the results of the interview also obtained information that one of the causes of the problem is the use of learning media that only focuses on printed books and lks alone and the lack of utilization of technology in learning. As a result, learning experiences become less engaging, highlighting the necessity for the development of technology-based learning media in high schools. This result is supported by research Mahzum et al. (2020) Which shows the results of interviews conducted with high school students. 70% of students said that physics lessons are fun lessons, but students find conventional methods uninspiring, which leads to diminished enthusiasm for learning and a decline in students' motivation to engage in learning activities. This aligns with the findings of the study (Hasanah et al., 2021) conducted at Public High School 1 Peusangan and Public High School 2 Peusangan. shows that learning motivation in these high schools has not been maximally marked, it's evident from the learning process that some students struggle to maintain attention and concentration, resulting in only a minority being actively engaged. Moreover, many students lack confidence, refrain from asking questions, and remain passive during group presentations, relying on their peers instead of participating actively in the learning process.

Based on the results of the analysis of student needs questionnaires filled out by 99 students of 11th grade Public High School 7 Bengkulu City obtained information that in the aspect of student responses to physics learning showed 66.31% of students were less active when physics learning took place, students were not excited when learning physics and students had difficulty understanding the material using the learning media used. In addition, in the aspect of learning, media needs to increase learning motivation, 70.93% of students need learning media that can increase student learning motivation. In the aspect of the need for technology-assisted learning media shows 86.52% of students strongly agree with the development of technology-assisted learning media, and in total the overall results show the results of 74.59% of students with the category "Agree" based on the interpretation of the Likert scale in table 2. So it can be concluded that students need technology-based learning media that can be accessed anywhere and anytime and can increase learning motivation.

Based on the results of the literature study conducted by researchers, one of the learning media that can increase student learning motivation is e-books, this is reinforced by the results of previous research, namely research by Musdalifa (2021) which states that the use of e-books in physics learning can increase student learning motivation. And by following the development of technology so that learning media must continue to be improved, therefore researchers develop physics e-books assisted by flipbooks and augmented reality (AR). The material analysis results during the teacher interview found that the material made in the physics e-book is dynamic fluid. This is because a lot of dynamic fluid material must be simulated so that the development of physics e-books assisted by flipbooks and augmented reality (AR) is one of the right choices.

2. Design Stage

This stage is the development of e-books. The first stage is the selection of applications for making flipbook-assisted physics e-books and augmented reality (AR), at the stage of making e-books the material described is written first in MS.word then made into a pdf file and inserted into the flipbook making website, namely publuu.com. after editing is complete, augmented reality (AR) is added which has been prepared previously, making augmented reality (AR) using the Assemblr Edu application, then videos and images are added to make learning media more interesting. The results of the design of the Physics e-book assisted by flipbook and augmented reality (AR) on dynamic fluid material can be seen in Figure 1.

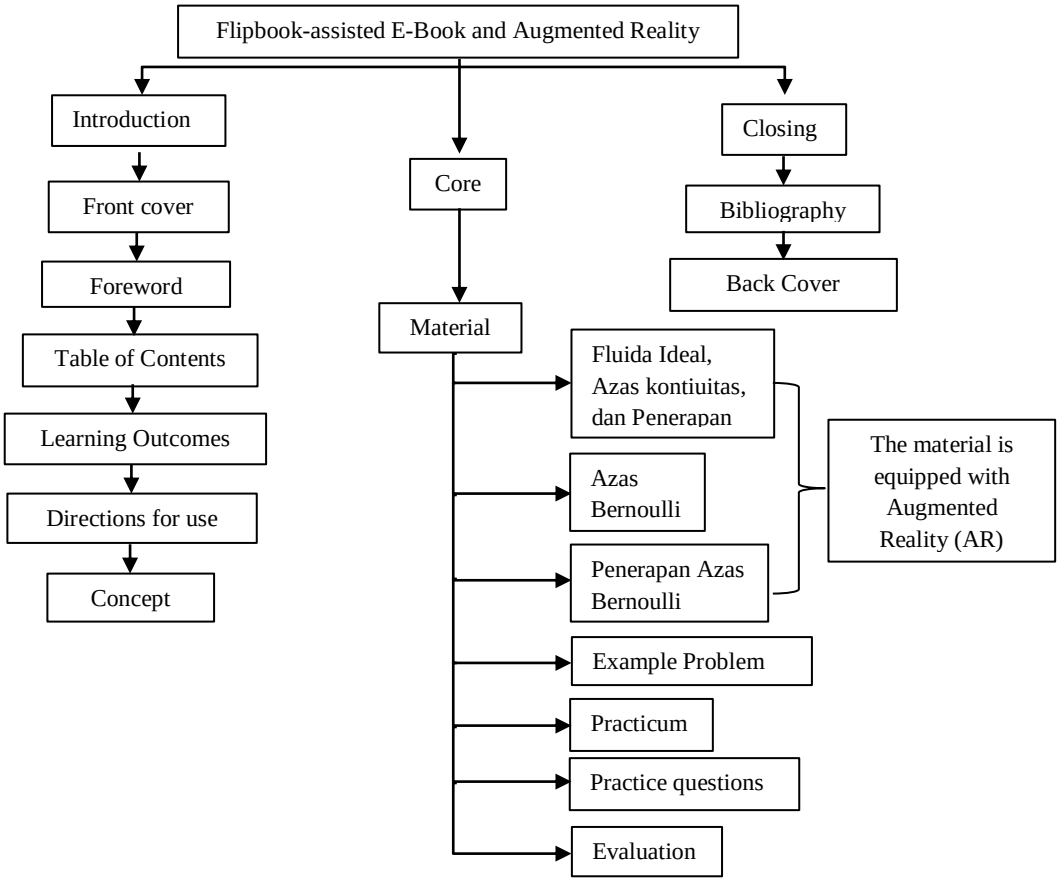

Figure 1. E-Book Design

The e-book design refers to previous research by (Gustian & Riyanto, 2021) with modifications to the material where in this study the material used is dynamic fluid material and the e-book developed has augmented reality in it.

3. Development stage

At this stage, the manufacture of Physics e-books assisted by flipbooks and augmented reality (AR) on dynamic fluid material is carried out following the design at the design stage, the results of making e-books can be seen in figures 2 and 3:

Figure 2. Front Cover View Flipbook-assisted Physics E-Book and Augmented Reality (AR)

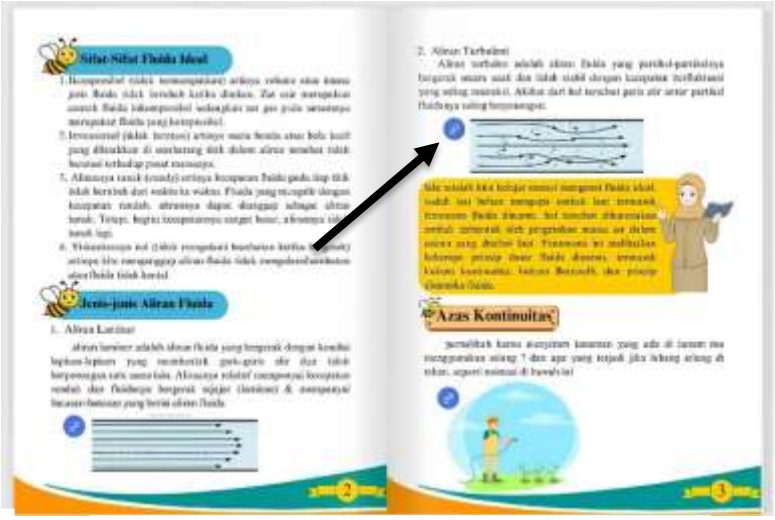

Figure 3. Display of Physics E-Book Contents Aided by Flipbook and Augmented Reality (AR)

Figure 3 is a display of the contents of the Flipbook-assisted Physics E-Book and augmented reality (AR) and the arrow in Figure 4 shows the marker of augmented reality (AR) which can be directly accessed on students' smartphones by clicking on the part indicated by the arrow in Figure 4. Augmented reality (AR) in this e-book does not use a barcode, making it easier for students to access augmented reality.

After the media's completion, the developed materials are validated. The validity assessment involves input from three experts, including two physics education lecturers and one high school physics teacher. This validation aims to evaluate the suitability and effectiveness of the physics e-book that has been developed, assisted by flipbook and augmented reality (AR). The outcomes of the media validation process are summarized in Table 6.

Table 6. Feasibility analysis results of physics e-books aided by Flipbook and Augmented Reality (AR)

Indicator	Percentage	Category
Contents	98%	Very Feasible
Presentation	94%	Very Feasible
Language	88%	Very Feasible
Media	98%	Very Feasible
Learning Motivation	90%	Very Feasible
Overall	**94%**	**Very Feasible**

Based on the results of the analysis in Table 6, the feasibility of physics e-books assisted by flipbooks and augmented reality (AR) is seen from five assessment indicators consisting of content, presentation, language, media, and aspects of student learning motivation. The content indicator shows a percentage of 98%, the presentation indicator shows a percentage of 94%, the language indicator shows a percentage of 88%, the media indicator shows a percentage of 98%, the learning motivation indicator shows a percentage of 90%. Based on the overall average, it shows a percentage of 94%, which is a category that is very feasible to use as learning media based on the validation results criteria in Table 3.

4. Implementation Stage

After the physics e-book assisted by flipbook and augmented reality is declared feasible to use after validation, the next stage is to conduct a small or limited scale trial with 37 students of class 11th grade Science 3 Public High School 7 Bengkulu City to determine student responses to the media developed and to determine the increase in student learning motivation after the use of physics e-book assisted by flipbook and augmented reality on dynamic fluid material. At this stage, the researchers collected data by distributing student response questionnaires to the developed media, pretest questionnaire sheets of student learning motivation before the trial of the developed media, and posttest sheets of student learning motivation after using the media.

Based on the results of data obtained through the distribution of student response questionnaires to physics e-books assisted by flipbooks and augmented reality (AR) on dynamic fluid material, the results of each assessment indicator covering appearance, presentation of material, and benefits can be seen in Table 7.

Table 7. Results of student response questionnaire analysis

Rating	Average	Category
Display	87,64 %	Very good
Presentation of Material	84,35 %	Very good
Benefits	89,86 %	Very good
Overall Average	**87,16 %**	**Very good**

Based on the student response questionnaire analysis results in Table 7, the assessment of the display aspect shows an average of 87.64%, the assessment of the material presentation aspect shows

an average of 84.35%, and the benefit aspect shows an average of 89.86%. And overall obtained an average of 87.16% with a very good category based on the interpretation of the Likert scale in Table 4. This shows that the use of physics e-books assisted by flipbooks and augmented reality (AR) in learning physics on dynamic fluid material gets a very good response from students.

The results of the analysis of the student learning motivation questionnaire measured using four components, namely Attention, Relevance, Confidence, and satisfaction, obtained the results of the analysis as in Table 8:

Table 8. Results of student learning motivation questionnaire analysis

Indicator	N-Gain	Category
Attention	0,58	Medium
Relevance	0,69	Medium
Confidence	0,69	Medium
Satisfaction	0,87	High
Overall Average	**0,71**	**High**

The results of the analysis of the learning motivation questionnaire in Table 8, that the attention indicator shows an N-Gain value of 0.58, the relevance indicator shows an N-gain value of 0.69, the relevance indicator shows an N-gain value of 0.69, and the satisfaction indicator shows an N-gain value of 0.87. And based on the overall average, the N-gain value of 0.71 is in the high category based on the N-gain criteria in Table 5. This shows an increase in student learning motivation after the use of physics e-books assisted by flipbooks and augmented reality (AR) on dynamic fluid material.

5. Evaluation Stage

At this stage, an assessment of the research stages is carried out. There are two types of evaluation stages: formative and summative. Formative evaluation is carried out by assessing each stage of the research, one of which is done by revising the developed product so that it becomes a product that is suitable for use as a learning media. The product revisions made based on validator suggestions can be seen in Table 9.

Table 9. Validator comments and suggestions

	Comments and Suggestions
Validator	Animation content is adapted to the material
	Self-made video suggestion
	The developed learning media is good and can be used

Product revisions suggested by the validator have been carried out so that a product that is suitable for use as learning media is obtained.

Discussion

Based on table 6, the development of physics e-books assisted by flipbook and augmented reality (AR) on fluid material obtained an overall average percentage of 94% with the category "very feasible" based on the validation results criteria in table 3. This shows that the physics e-book assisted by flipbook and augmented reality (AR) developed, has fulfilled the aspects of content, presentation, language, media, and aspects of student learning motivation so that it can be concluded that the learning media developed is very feasible to be used in learning. This is supported by research results (Novita, 2023) with the conclusion that the expert or validator test results show that the augmented reality-based physics e-book developed shows an average percentage of 95.74% with the category very feasible to use. In addition, the research results of Kholiq (2020) show that BDF_AR2 (Digital Book of Physics Based on Augmented Reality) has validity results on aspects of suitability for learning 83.3%, Material Aspects 100%, Language aspects 83%, Media navigation aspects 91.6% and media display aspects 92.6%. Judging from the percentage assessment of feasibility aspects, it can be concluded that the e-book has very high feasibility test results in use.

Based on the results of the analysis of student response questionnaires assessed using three aspects of appearance, presentation of material, and media benefits, table 7 shows an overall percentage of 87.16% with "very good" criteria following the interpretation of the Likert scale in table 4, so it can be concluded that the physics e-book assisted by flipbook and augmented reality (AR) gets a very good response from students in learning. This result is supported by the research results (Bakri et al., 2018) It was concluded that the results of student responses to the augmented reality-based book media developed showed a percentage of 84.68% with a very good category. This research is in line with the results of research (Sumarsono & Anggaryani, 2022) The results of the student response questionnaire showed an average percentage of 97.03%, so it was concluded that the development of physics e-books received a very good response from students as learning media.

Based on the results of the learning motivation questionnaire in Table 8, the attention indicator shows an N-Gain value of 0.58 in the "medium" category based on the criteria in Table 5, this shows that there is an increase in student learning motivation where students pay more attention to the explanation of material from the teacher when using physics e-book learning media assisted by flipbook and augmented reality (AR). In addition, the relevance indicator shows an N-gain value of 0.69 in the "medium" category, meaning there is an increase in student learning motivation in the learning process. In this indicator, the aspect that is measured is student activeness in the learning process. The confidence indicator shows an N-gain value of 0.69 in the "medium" category according to the criteria in Table 5. This shows increased student confidence, where students are required to be active, such as by giving opinions during discussions. In the satisfaction indicator, the N-gain value of 0.87 is in the "high" category based on the N-gain criteria in Table 5, meaning that there is a significant increase in students in learning, where during learning, students feel happy if given awards and students are motivated to complete assignments on time with the e-book physics assisted flipbook and augmented reality (AR). Dan berdasarkan rata-rata keselurahan pada angket motivasi belajar siswa menunjukan nilai N-gain sebesar 0,71 berada pada kategori “tinggi” berdasarkan kriteria N-gain pada tabel 5. From the results of this analysis, it can be concluded that there is an increase in student learning motivation after using physics e-books assisted by flipbooks and augmented reality (AR) specifically on dynamic fluid material. These results are in line with several other studies that state that using e-books in physics learning can enhance students' learning motivation (Wulandari et al., 2022; Tambunan et al., 2020). In addition, students can learn independently and construct their own understanding, and students can be more active in learning after using e-books (Norzatiah et al., 2022).

CONCLUSION

Physics e-book assisted by flipbook and augmented reality (AR) to increase student learning motivation, has been validated by experts for feasibility testing and shows a percentage of 94% with a very feasible category used as physics learning media on dynamic fluid material. The results of student responses to the use of physics e-books assisted by flipbooks and augmented reality (AR) get a percentage of 87.16% to get a very good response from students in learning. And based on the questionnaire analysis of student learning motivation, the average value of N-gain is 0.71 with the category "High", meaning that students experience increased learning motivation after using physics e-books assisted by flipbooks and augmented reality (AR). Physics e-books assisted by Flipbook and augmented reality (AR) are very feasible to use as learning media and get a very good response by students in physics learning, and with the use of physics e-books assisted by Flipbook and augmented reality (AR) can increase student learning motivation, especially in dynamic fluid material.

Suggestions for further research are that there needs to be a significant increase in each indicator of student learning motivation, develop learning media widely to measure the improvement of other aspects in physics learning can be tried with different materials.

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