

DEVELOPMENT OF HYBRID TEXTBOOK

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ABSTRACT

The textbooks used by students currently still have limitations, including students only using one book with unattractive content, existing book not yet integrated with learning videos, and the school that was researched not developing teaching materials that can motivate students to learn mathematics. This research aims to determine the development procedures and the development quality of a *hybrid textbook*. This research uses the ADDIE development model (*Analyze, Design, Develop, Implement, and Evaluate*). Based on the validation results tested using the Gregory, the content validity value of the material is 1 and the media content validity value is 0.96, so the *hybrid textbook* is valid based on the eligibility aspects of the content, presentation, language, and graphics. Based on the results of limited trials, a practicality percentage of 80% was obtained which was classified as practical, and the average grade of the class met the KKM, namely $78 > 75$ which was effective in the good category. Based on the results of field trials, a practicality percentage of 85% was obtained which was classified as very practical, and the average grade for the class met the KKM, namely $82 > 75$ which was effective in the very good category. So, it can be concluded that the development of a *hybrid textbook* is valid, very practical, and effective in learning mathematics.

Keywords: hybrid textbook; learning videos; QR code

1. Introduction

Current developments in science and technology have led to changes in progress in terms of human life (Yuniarti et al., 2020). Efforts to balance change and progress require an adaptive attitude to always learn so as not to be left behind by increasingly rapid technological developments. Education has now entered the 21st century of learning, where learning is required to make changes based on technological innovation. In line with this, *the Partnership For 21st Century Skills*, states that students must be able to master the 21st century skills needed today, namely the 4Cs (Greenhill, 2015). The development of these skills must be implemented in students' subjects and applied in the learning process.

Mathematics is an abstract subject, where the objects and symbols contained in mathematics do not exist in real life (Aghnia, 2021). Studying mathematics requires a good intermediary media in conveying the content of the learning material, in this case, the media used is a textbook.

Textbooks are very important for the successful implementation of learning in schools because they not only act as sources, but also as learning media, intermediaries for delivering learning materials, providers of evaluation questions, and can increase students' interest and motivation in learning (Fitriany, 2018). Apart from that, textbooks have an effective influence on increasing student activities and learning outcomes (Atmaja et al., 2021). However, the problem that often occurs is that the learning materials presented cannot be absorbed by students if they only read the material provided through textbooks. Another problem that arises is students' low interest in learning when using textbooks. According Prasetyono, he revealed that students' interest in reading was lacking because the titles and contents of the books presented were less interesting (Sari, 2018). Apart from that, lessons that are presented too much in textbooks tend to turn off interest and cause students to get bored if the textbook is not well designed (Suryani, 2015). So there is a need to develop textbooks that are interesting, concise, and in line with learning objectives. In line with that, the textbooks being developed can utilize other learning media to support learning activities, in this case learning videos.

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Researchers have conducted a preliminary study by interviews with teachers at SMA (SLUA) Saraswati 1 Denpasar and found problems occurring at the school, including (1) limited learning resources, especially for class XI students; (2) the use of textbooks in the school has not been utilized optimally in the class; and (3) there has been no development of teaching materials that can motivate students to learn mathematics. Apart from that, there are no class XI mathematics textbooks in schools that are integrated with learning videos. The gaps that occur are based on the data and facts above, it is necessary to find a solution to overcome them. This is what underlies the development of a *hybrid textbook*. Teachers can use a combination of the two, namely textbook teaching materials with video learning media in an integrated manner, which in this case is called a *hybrid textbook*. Technology is used to insert learning videos in the *hybrid textbook*, namely *QR codes*.

This research and development aim to determine the procedures for developing a *hybrid textbook*, as well as to determine the validity, practicality, and effectiveness of a *hybrid textbook*. The benefits of developing a *hybrid textbook* are expected to facilitate students' active learning and build student motivation so that students' ability development increases. With the resulting *hybrid textbook*, it can be used as literature and an alternative for teachers to deliver learning material more effectively and efficiently.

2. Research Methods

This type of research is research and development. The model used in this research is the ADDIE (*Analyze, Design, Develop, Implement, and Evaluate*) development model. The product validation subjects consisted of 4 lecturers at PGRI Mahadewa Indonesia University. The trial subjects were students from SMA (SLUA) Saraswati 1 Denpasar in classes XI MIA 1 and XI MIA 2. The trial was carried out on limited trials with the number of 6 students in class XI MIA 2 and field trials consisted of 24 students in class XI MIA 1. Data collection methods in this research are interviews, document studies, questionnaires, and tests. The data collection instruments are used in this research were interview instruments, validity instruments in the form of validation sheets for material experts and media experts, practicality instruments in the form of student response questionnaires, and effectiveness instruments in the form of learning

outcomes tests using evaluation questions. The data analysis technique used in this research is qualitative and quantitative data analysis.

Instrument Validity Analysis

The analysis techniques carried out on the instrument are: (1) validity test for evaluation questions are analyzed using the *Pearson Product Moment* and reliability test using *Cronbach's Alpha*. Meanwhile, (2) the *hybrid textbook* validity sheet validation format and the student response questionnaire validation format were each tested for validity using the *Gregory*.

Hybrid Textbook Validity Analysis

In analyzing a *hybrid textbook*, what must be done is material validity analysis and media validity analysis. The results of the assessment recap are used to carry out cross-tabulations using the *Gregory* as follows.

Table 1. Cross Tabulation of 2 Validators (Gregory, 2015)

		Validator 1	
		Irrelevant (score 1 or 2)	Relevant (score 3 or 4)
Validator 2	Irrelevant (score 1 or 2)	A	B
	Relevant (score 3 or 4)	C	D

The results of the cross-tabulation are used to determine the validity value or content validity using the following formula :

$$\text{Content Validity (V)} = \frac{D}{(A + B + C + D)}$$

Then interpret the results of the content validity values obtained with the following conditions: the content validity range (V) ranges from 0 to 1. If the validity results are close to 0, it indicates a low level of validity. Conversely, if the validity result is close to 1, it indicates high validity (Retnawati, 2016).

Hybrid Textbook Practicality Analysis

The data used to test the practicality of *hybrid textbook* was obtained through student response questionnaires. The practicality score is calculated using the formula according to Nesri (2020) as follows:

$$\text{Practicality Percentage (P)} = \frac{\sum TSe}{\sum TSh} \times 100\%$$

Information:

- $\sum TSe$ = the sum of the response scores of all students
 $\sum TSh$ = the maximum score multiplied by the number of students

Then interpret the data obtained from the percentage of practicality (P). The *hybrid textbook* is said to be practical if it reaches the practical or very practical category. The percentage scores obtained are adjusted to the following practicality categorization guidelines as follows.

Table 2. Practicality Categorization Guidelines (Nesri, 2020)

Range of Practicality	Category
$80\% < P \leq 100\%$	Very Practical
$60\% < P \leq 80\%$	Practical
$40\% < P \leq 60\%$	Less Practical
$20\% < P \leq 40\%$	Impractical
$0\% < P \leq 20\%$	Very Impractical

Hybrid Textbook Effectiveness Analysis

Effectiveness analysis is obtained from student learning outcomes tests after using a *hybrid textbook*. Students will be said to be complete if the average class score has met the Minimum Completeness Criteria (KKM) ≥ 75 . Determine the average score using the formula according to Nurgiyantoro (in Ferdian, 2017) as follows :

$$\text{Effectiveness Level (E)} = \frac{\sum_{e=1}^n x_e}{n}$$

Information:

- $\sum_{e=1}^n x_e$ = Total student scores
 n = The number of students

Then interpret the data with the KKM limit in schools, namely 75. With the following conditions: if the effectiveness level is ≥ 75 , then the *hybrid textbook* is said to be effective. Meanwhile, if the effectiveness level is < 75 , then the *hybrid textbook* is said to be ineffective. The level of effectiveness obtained can be categorized using the tendency criteria according to Purwati (2021) as follows.

Table 3 Effectiveness Categorization Guidelines (modified from Purwati, 2021)

Propensity Criteria	Category
$\bar{X} \geq M_i + 1,8SD_i = \bar{X} \geq 80$	Very good

$M_i + 0,6SD_i \leq \bar{X} < M_i + 1,8SD_i$ $= 60 \leq \bar{X} < 80$	Good
$M_i - 0,6SD_i \leq \bar{X} < M_i + 0,6SD_i$ $= 40 \leq \bar{X} < 60$	Pretty good
$M_i - 1,8SD_i \leq \bar{X} < M_i - 0,6SD_i$ $= 20 \leq \bar{X} < 40$	Not good
$\bar{X} < M_i - 1,8SD_i = \bar{X} < 20$	Very Not Good

3. Results and Discussion

The development of the *hybrid textbook* was carried out based on the stage of ADDIE development model. This model consists of five stages, namely the *analysis*, *design*, *development*, *implementation*, and *evaluation*.

The first stage is an *analysis* of needs, curriculum, materials, and facilities. The results obtained at this stage are that the problems that occur in schools are limited learning resources for class XI students. The textbooks currently used by students still have limitations, including students only using one package book with less interesting content presentation, existing book have not been integrated with learning videos, and the school studied there has been no development of teaching materials that can motivate students in learning mathematics. Therefore, researchers developed a *hybrid textbook*. Curriculum analysis was carried out so that the preparation of the *hybrid textbook* was to the demands of the 2013 curriculum used for class XI students at school. Material analysis was carried out to review the main material and learning objectives used in preparing the *hybrid textbook*. Facility analysis was carried out to determine the condition of *wifi* or the internet and the involvement of *smartphones* in learning as a support for learning activities using *hybrid textbook*.

The second stage is *design* by designing *draft-1* (initial design), designing the book cover, and designing the instruments are used. Preparation of *draft 1* begins with creating a book design based on systematic writing which consists of an introductory page, the body of the book, and an ending page (Kurniawan, 2020). Making a book cover using the *Procreate*, the design process begins with making an initial sketch in the form of an illustration image on a B5-sized digital canvas, the second stage is the process of thickening the image (*lineart*) according to the sketch, the third stage continues with the process of coloring the image and

background, and the fourth stage is the final process by adding text and logos.

The third stage is *development*, namely making *prototype-1* and validating the product with material experts and media experts to determine the validity of the *hybrid textbook*. At this stage, product revisions were also carried out based on assessment suggestions from the validator which resulted in *prototype-2*. The *hybrid textbook* is arranged systematically according to the design that has been made, namely: front and back cover, foreword, table of contents, instructions for using the *hybrid textbook*, image definitions (*icons*), indefinite integral pages (containing basic competencies, learning objectives, and concept map), learning activity material 1 (equipped with example questions, material summaries, and practice questions), learning activity material 2 (equipped with example questions, material summaries, and practice questions), evaluation questions, glossary, bibliography, and developer profile. The number of videos contained in the *hybrid textbook* is 14 learning videos in the form of *QR codes*.

The fourth stage is *implementation*, namely product trials in class which are carried out twice, namely limited trials and field trials to determine the practicality and effectiveness of using a *hybrid textbook*. In the trial activity, students were actively involved in discussion and independent learning, students were enthusiastic about learning using a *hybrid textbook*, and students were interested in learning the material in more depth by scanning the *QR Code* containing the learning video. This shows that a *hybrid textbook* encourages students' curiosity and motivation in learning.

The fifth stage is an *evaluation* carried out throughout the research by analyzing data obtained from validation sheets, student response questionnaires, and tests. In the end, conclusions were drawn based on the results of the final product obtained, namely the *hybrid textbook* which was declared valid, very practical, and effective.



Figure 1. Hybrid Textbook Final Product

Data analysis carried out included: (1) validity analysis obtained from validation sheets from material experts and media experts; (2) practical analysis obtained from student response questionnaires in limited trials and field trials; (3) an analysis of the effectiveness obtained from student learning outcomes tests after using *hybrid textbook* in limited trials and field trials.

Validity Testing

Data analysis on the validation sheet refers to Table 1, namely using the *Gregory*. The *hybrid textbook* validity test results are summarized in the following table:

Table 4. Hybrid Textbook Validity Test Results (Source: Data Processing on Validation Sheet)

Validation Sheet	Content Validity (V)	Interpretation
Material Expert	1	High Validity
Media Expert	0,96	High Validity

The content validity value obtained on the validation sheet by the material expert is 1 with a high validity interpretation because if the validity result is close to 1 it indicates high validity (Retnawati, 2016). This shows that the validity of the material is assessed from the aspects of the eligibility of content, presentation, and language in the *hybrid textbook* which is declared valid with slight revisions from material expert suggestions. The content validity value obtained on the validation sheet by media experts is 0.96 with a high validity interpretation. This shows that the validity of the media as assessed from the graphics aspect in the *hybrid textbook* is declared valid with slight revisions from media expert suggestions. Therefore, it can be concluded that the *hybrid textbook* is valid and suitable for use so it can be tested in class. In line with research by Agghnia

(2021) and Krismari (2016) teaching materials developed by referring to eligibility standards of content, presentation, language, and graphics are declared valid and suitable for use.

Practicality Testing

The selection of the number of students in this limited trial was based on research by Ekawati (2019), namely, a total of 6 students were selected with categories of high, medium, and low mathematical cognitive abilities. The *hybrid textbook* practicality test results are summarized in the following table:

Table 5. *Hybrid Textbook* Practicality Test Results (Source: Data Processing in Student Response Questionnaires)

Trial Phase	Practicality Percentage (P)	Category
Limited	80%	Practical
Field	85%	Very Practical

Based on the results of the student response questionnaire in the limited trials, the practicality percentage was 80%. Referring to the categorization in Table 2, the practicality range $P = 80\%$ is included in the "Practical" category. So, it can be concluded that 6 students with different abilities can use *hybrid textbook* practically in learning. This is reinforced by students' suggestions which state that *hybrid textbook* helps in teaching and learning activities side by side with technology so that they are practical to use in learning. The results of research developed by Septia and Edriati (2019), showed that technology-based textbooks were practically to be used. Based on overall suggestions from students, there are no revisions to the *hybrid textbook*. So, then the *hybrid textbook* can be used in field trials.

Based on the results of the student response questionnaire in the field trials, the practicality percentage was 85%. Referring to the categorization in Table 2, the practicality range $P > 80\%$ is included in the "Very Practical" category. So, from the results of this analysis, it can be concluded that there has been an increase in the percentage of practicality used by 24 students in one class, namely the *hybrid textbook* is very practical to use in learning. The factors that cause *hybrid textbook* to be declared very practical are: a) the attractive appearance of *hybrid textbook* where the colourful design

makes students more enthusiastic and motivated in learning; b) the content of the material presented is concise and clear and contains in-depth study of the material presented in the learning video which prevents students from getting bored quickly, encourages students' curiosity and critical thinking; and c) the use of *QR Codes* in *hybrid textbook* makes it easier for students to access learning videos.

Effectiveness Testing

The *hybrid textbook* effectiveness test obtained from the student mathematics learning outcomes test is summarized in the following table:

Table 6. *Hybrid Textbook* Effectiveness Test Results (Source: Data Processing in Student Mathematics Learning Outcomes Tests)

Trial Phase	Effectiveness Level (E)	Interpretation	Category
Limited	78	Effective	Good
Field	82	Very Effective	Very Good

Based on the results of data analysis in limited trials, the level of effectiveness of using a *hybrid textbook* was obtained amount to 78. Referring to the categorization in Table 3, the average score of 78 is classified as "Good". This also shows that the level of effectiveness in the limited trials has met the class average value, namely $78 > 75$, so it can be concluded that the *hybrid textbook* is effectively used in learning with a good category. By the results of research developed by Septia and Edriati (2019), the results showed that technology-based textbooks are effective because they can help students gain a deeper understanding of the subject matter.

Based on the results of data analysis in field trials, the level of effectiveness of using a *hybrid textbook* was obtained amount to 82. Referring to the categorization in Table 3, the average score of 82 is in the "Very Good" category. This also shows that the level of effectiveness in the field trials has met the class average value, namely $82 > 75$, so it can be concluded that the *hybrid textbook* is effectively used in learning with a very good category. The factors that cause *hybrid textbook* to be effective are innovation or product novelty, namely: a) the presentation of material content in a *hybrid textbook* can enable students to learn according to their respective learning styles, students can read the material presented in the

book as well as listen and watch through video learning media, students can be actively involved in taking notes and answering questions in the book according to the directions stated in the *hybrid textbook*; and b) *hybrid textbook* is prepared by considering indicators of competency achievement, so the learning objectives can be achieved well.

4. Conclusions

Based on the exposure results above, it can be concluded as follows:

- a) *Hybrid Textbook* development procedure was adapted from the ADDIE development model with five stages, namely: a) *Analyze*, namely the preliminary analysis stage which includes needs analysis, curriculum analysis, material analysis and facilities analysis; b) *Design*, namely the design process which begins with preparing *draft-1*, designing the *cover*, and designing the instrument; c) *Develop*, namely the process of realizing a product in the form of a *hybrid textbook* by making *prototype-1*, followed by validating the *hybrid textbook* by material experts and media experts and revising the product based on expert advice to produce *prototype-2*; d) *Implement*, namely the stage of testing the *hybrid textbook* in the class to determine the practicality and effectiveness of using the *hybrid textbook*, the trial was carried out twice, namely limited trials and field trials; and the final stage is e) *Evaluate*, namely the stage of data analysis and drawing conclusions, where it is found that the final product is a *hybrid textbook* which has been validated, tested and evaluated and declared valid, very practical and effective for use in mathematics learning.
- b) The *hybrid textbook* validity test carried out by material experts and media experts obtained the content validity value of the material is 1 and the media content validity value is 0.96, so the *hybrid textbook* is valid based on the eligibility aspects of the content, presentation, language, and graphics. The practicality test of the final *hybrid textbook* product which was carried out at the final implementation of the field trials, obtained a practicality percentage of 85% which was classified as very practical, so the *hybrid textbook* was declared very practical. The effectiveness

test obtained an average class score of 82 which was classified as very good and had met the KKM, so the *hybrid textbook* was declared effective. So it can be concluded that the *hybrid textbook* is declared valid, very practical, and effective for use in mathematics learning.

Based on the results of this research, so the following things can be suggested for the future research:

- a) Students are advised to use this *hybrid textbook* in learning material on indefinite integrals and algebraic functions in the compulsory-mathematics subject for class XI, both in class and outside of class.
- b) Teachers are advised to utilize this *hybrid textbook* as supporting teaching material on an ongoing basis in facilitating teaching and learning activities in the class, so the teaching and learning process becomes more effective.
- c) Future researchers are advised to develop this *hybrid textbook* with wider material coverage and the addition of more diverse evaluation questions. Researchers are also advised that in the future they can develop *hybrid textbook* into the fully digital realm and also can do the practicality testing using teacher response questionnaires in the future research.

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