BIODIDAKTIKA: Jurnal Biologi dan Pembelajarannya, Vol.20, No.1, 2025, pp. 63-72
e-ISSN 2527-4562. DOI. 10.30870/biodidaktika.v20i1.29331

The Validity Test of Flipbook Learning Media in A Genetics Course Based on Local Wisdom in North Maluku

Submitted 28 October 2024 Revised 14 January 2025 Accepted 16 January 2025

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Abstract

Learning media plays a role in generating enthusiasm and interest in learning for students, so an interesting learning media is needed that can help students in the learning process. *Flipbook* is one of the interactive learning media that combines visual representation, narration, and interactive simulation that is expected to help students. The purpose of this study is to see the validity of the flipbook for genetics course produced from local species data of North Maluku. The study is a research and development study *(Research and Development)* which refers to the Thiagarajan 1974 development model, namely 4D *(Define, Design, Develop, and Disseminate).* The results showed that the flipbook learning media was very valid for use in learning with a percentage of 92% from material, media and language experts in this case by lecturers, and 98% from material, media and language experts in this case by teachers. The level of practicality of the learning media flipbook has a percentage of 91% obtained from student responses. This means that *flipbook* learning media is very valid and very suitable for use.

Keywords: Learning Media, *Flipbook*, Genetics, Local Wisdom

INTRODUCTION

Learning media plays an important role in the learning process, because it can represent what is less able to be expressed through words, the abstractness of the material that can be concretized, thus helping students understand the material to be delivered (Rasyid *et al*., 2017). Learning media plays a role in arousing enthusiasm and interest in learning, thus making the learning atmosphere more interesting. Various forms of learning media are made concretely according to the material so that it is hoped that students can get maximum results (Tafonao, 2018).

Flipbook is one of the media that can be used in learning. *Flipbook* media is one of the structured media, there are writings, images and sounds displayed in digital format, so that the flipbook contains multimedia elements that make users more active (Sari & Ahmad, 2021). Thus, the application of flipbook media makes learning more meaningful, communicative, interactive and effective.

Some of the advantages of flipbooks include presenting learning materials in the form of words, sentences and pictures, can be equipped with colors so that they are more attractive, the manufacturing process is relatively easier, can be carried anywhere so that it makes it easier for students to read anywhere, and can increase student learning activities (Susilana &

Riyana, 2008). In addition, it was also stated by Andarini *et al*. (2013), that flipbooks help improve students' mastery of abstract things or events that cannot be presented in class. Flipbook media has been shown to significantly improve student understanding, as evidenced by qualitative research in which students reported increased understanding after using flipbooks (Harahap *et al*., 2024).

Genetics is one of the learning materials that requires a learning medium so that the understanding obtained is more meaningful. Genetics is the basis of biology and is the foundation for responding to the development of science and technology, but genetics is considered a material that is difficult for students and students to understand even after completing the learning (Hera, 2017; Melsa *et al*., 2019; Roini & Sundari, 2019). Genetic material is also still considered difficult by biology teachers in teaching it to students (Roini & Sundari, 2019).

The genetic concepts taught in schools are generally old concepts, based on historical approaches, and contain misconceptions. Students often do not reconstruct their thinking after learning genetics (Roini, 2013). Genetics learning should be programmed using clear and credible learning sources so that genetic material is easier to understand and does not cause misconceptions. Based on the results of observations of high school students in Ternate City and Biology students at Khairun University in 2023, it was found that one of the genetic materials found to contain misconceptions was the expression of genetic material, or in a smaller concept, protein synthesis and its relationship to the expression of the phenotype of living things.

Efforts that can be made to improve conceptual understanding and overcome genetic misconceptions are to provide textbooks that contain materials that are contextually experienced by students. Textbooks are packaged in a form that is easy to understand, easy to study at any time and repeatedly. Relevant textbooks to overcome these conditions are in the form of flipbooks. Flipbooks are interactive learning media that combine visual representation, narrative, and interactive simulation (Rijal, 2017; Rahayu *et al*., 2021). Genetics *flipbooks* not only explain genetic concepts comprehensively but also stimulate student's curiosity (Rijal, 2017). The genetics material presented in flipbooks is designed attractively based on phenomena resulting from observations or exploration of events in the real world.

The genetic material content in the flipbook is designed based on the local wisdom of North Maluku which is popuar known as Moloku Kie Raha which promotes local culture in preserving biological resources (flora and fauna) so that they remain sustainable and can be used as a learning resource for students. The success of efforts to preserve biological resources can be seen from the morphological or phenotypic indicators of living things. It is

understood that the local wisdom of Moloku Kie Raha in manipulating the environment of living things can affect the activity of its genes in expressing. The results of research by Jayaningsih *et al*., (2019), revealed a very real interaction between genotype and environment (season) on the observed rice characters (panicle length, panicle axis length, number of primary branches, number of secondary branches, number of tertiary branches, total grain per panicle, and grain density per primary branch).

The importance of learning content related to the surrounding environment is the basis for the development of genetic materials based on local wisdom (Abdulatip *et al*., 2015; Anugraheni *et al*., 2018). North Maluku, with its rich of Moluku Kie Raha culture and nature, provides great potential to be integrated into genetics learning. The genetics flipbook that is developed will not only cover scientific aspects, but also consider local values and wisdom as an integral part of the learning process. The objective and the question of the study is to see the validity of the flipbook produced based on local some species data from North Maluku. Based on the thoughts that have been described, it is necessary to make new breakthroughs in IT-based genetics learning, as well as local phenomena and wisdom so that genetics learning becomes more meaningful and freer from misconceptions.

METHOD

This type of research is research and development, by developing flipbook learning media in the Genetics course based on local wisdom in North Maluku referring to the Thiagarajan 1974 development model, namely 4D *Define, Design, Develop, and Disseminate* (Small-scale dissemination). The research location is throughout North Maluku which is considered to have phenomena and local wisdom that are relevant to the concept of genetic material expression. The research respondents are the community or community leaders who are active in preserving flora and fauna on the Moloku Kie Raha. The location of the flipbook product manufacturing is carried out at the FKIP Computer Laboratory, Khairun University. The research subjects are undergraduate and postgraduate students of Biology Education Khairun University.

Determination of the validity of the flipbook using the Likert scale, with data obtained in the form of numbers interpreted in a quantitative sense (Sugiyono, 2018). Quantitative data is then converted based on the predetermined score weight.

1. Analysis Validity of the *Flipbook*

The validation data results were converted using Likert scale criteria as shown in Table 1.

Table 1. Categorization of *Flipbook* Questionnaire Results

No.	Category	Score
1.	Very good	5
2.	Good	4
3.	Good enough	3
4.	Less good	2
5.	Not good	1

(Source: Arikunto, 2011)

Determination of the percentage of validity according to Arikunto (2011) namel:

Eligibility %= (SA/MC) x 100%

Description:

SA = Score Acquisition

MC = Maximum Score

The results of the calculation of the percentage of eligibility are interpreted into validity categories in Table 2.

Table 2. Validity Value Category *Flipbook*

Category	Category	Category
A	86-100	Very valid
B	76 – 85	Valid
C	56 – 75	Quite Valid
D	< 55	Less Valid

2. Analysis of the Practicality of Flipbooks

User response data in the form of numbers is categorized using a Likert scale in Table 3.

Table 3. Likert Scale for the *Flipbook* Practicality Questionnaire

No.	Category	Score
1.	Very good	5
2.	Good	4
3.	Good enough	3
4.	Less good	2
5.	Not good	1

The practicality criteria of flipbooks are presented in Table 4.

$$P = \frac{f}{N} x\ 100\%$$

Information:

P = Percentage of assessment

f = Score obtained

N = Overall score

Table 4. Practicality Criteria *Flipbook*

Interval	Criteria
$P > 81.25\%$	Very practical
$62.50\% < P \leq 81.25\%$	Practical
$43.75\% < P \leq 62.50\%$	Quite practical
$25.00\% < P \leq 43.75\%$	Less practical
$P \leq 25.00\%$	Very practical

(Source: Sugiyono, 2018)

RESULTS AND DISCUSSION

This research on the development of a flipbook for the Genetics course based on the Moloku Kie Raha phenomenon and local wisdom refers to the 1974 Thiagarajan development model, namely 4D (*Define, Design, Develop, and Disseminate*).

1. *Define*

   At this stage, a needs analysis is carried out by determining the requirements for developing a flipbook on Genetics courses that are in accordance with user needs, based on the phenomenon and local wisdom of Moloku Kie Raha. Then, front -end analysis, analysis of the Biology Education Study Program (S1) curriculum, RPS MK Genetics, analysis of product user characteristics, formulation of objectives (specifying instructional objectives), and material analysis.

2. *Design*

   The activities carried out at this stage are more focused on the results obtained at the initial investigation stage, by designing a product in the form of a flipbook that is adjusted to the user to be attractive and easy to use. Determination of the materials to be included in the flipbook is carried out at this stage which consists of six chapters, in the form of an introduction, protein synthesis: transcription, genetic code, protein synthesis: translation, towards the expression of the phenotype of living things and the genetic diversity of local plants moluku kie raha.

3. *Develop*

   The flipbook produced at this development stage will then be evaluated by a validator. The flipbook media will be validated by media, material and language experts. At this stage, an expert appraisal is carried out, namely validating the feasibility of the product design, by testing the content and readability by experts in their fields. The evaluation is carried out by prospective users, namely lecturers in charge of the Genetics Course, undergraduate and postgraduate students of the Biology Education study program. Revisions are made based on input and criticism from experts and prospective product users so that they are valid and according to user needs. The results of the flipbook revision

at this stage are then referred to as the final draft which is ready to be used in dissemination activities.

The resulting flipbook is then validated by media, material and language experts, with each validator consisting of lecturers and teachers. At this stage, expert appraisal is carried out, namely validating the feasibility of the product design, by testing the content and readability by experts in their fields. On the digital flipbook media validation sheet , there are 3 aspects that are assessed, namely the feasibility of the content, the feasibility of the presentation and the feasibility of the language. The validation sheet uses a Likert scale measurement. The assessment scores are 4 (Strongly Agree), 3 (Agree), 2 (Disagree), and 1 (Disagree). The results of the digital flipbook media feasibility test can be seen in Table 5 and Table 6.

Table 5. Validation Results of *Flipbook* Learning Media by Lecturers

No.	Rated Aspect	Percentage	Category
1	Content feasibility aspects	93	Very Valid
2	Aspects of presentation feasibility	92	Very Valid
3	Language feasibility aspect	90	Very Valid
	Average	92	Very Valid

Table 6. Validation Results of *Flipbook* Learning Media by Teachers

No.	Rated Aspect	Percentage	Category
1	Content feasibility aspects	98	Very Valid
2	Aspects of presentation feasibility	97	Very Valid
3	Language feasibility aspect	98	Very Valid
	Average	98	Very Valid

Based on Table 5 and Table 6, it is obtained that the flipbook learning media that has been developed is included in the very valid category with a percentage of expert validators of media, materials and language of 92% from lecturers and 98% from teachers. This shows that the flipbook learning media is suitable for use as a reference for students in the learning process in the Genetics course. Flipbooks are expected to provide benefits to users, especially in the learning process. This is in accordance with research conducted by Anjarsari *et al*. (2022) flipbook media is used as a tool to assist in delivering material from teachers to students, fostering student interest in learning, improving student learning outcomes and increasing knowledge in critical thinking skills, especially for elementary school students. In another study, the application of flipbook media showed its effectiveness in improving learning outcomes in Natural Sciences (Jayanti & Setyasto, 2024). Media *flipbook* increased motivation in learning motivation which will indirectly

increase the effectiveness of learning activities. This is proven in a study conducted by Ramdania (2013), on the use of flash flipbook media in information and communication technology learning to improve student learning outcomes. Based on the study, information was obtained that there was an influence of flash flipbook media on improving student learning outcomes.

4. *Disseminate*

Disseminate was conducted on a small scale, namely 5 undergraduate and postgraduate students of Biology Education each. At this stage, several revisions were made based on input and criticism from prospective product users to make it valid and according to user needs. The results of the flipbook revision at this stage are then referred to as the final draft which is ready to be used in disseminate activities.

The practicality of flipbook learning media can be known through a questionnaire given to students. This is done to find out students' responses to digital flipbook learning media used through a research instrument in the form of a response questionnaire. In the analysis of student response data, the score for each answer uses a Liker scale. The results of the analysis of student response questionnaires to digital flipbook learning media can be seen in Table 7.

Table 7. Results of Practicality Analysis of *Flipbook* Learning Media by Students

No.	Rated Aspect	Percentage	Category
1	Language feasibility aspect	90	Very Practical
2	Readability aspects	90	Very Practical
3	Aspects of presentation feasibility	92	Very Practical
4	Display aspect	93	Very Practical
5	Benefits aspect	92	Very Practical
	Average	91	Very Practical

Based on Table 7, the information obtained that the flipbook learning media that has been developed received a positive response from students and is included in the very practical category with a percentage of 91%. This shows that the flipbook learning media provides effective and efficient use in the learning process. Providing convenience for students in learning, the interactive features that make students directly involved in the media, in addition to having flexibility because it can be used anywhere and can be used independently in this case independent learning, materials can be accessed at any time. This is in accordance with research conducted by flipbook has an interactive nature that encourages greater student involvement, as evidenced by a 100% class completion rate in one study (Indriyani *et al*., 2006).

This is in line with research conducted by Aprilia *et al*. (2017), *flipbook* is one of the learning media that has advantages, including being able to convey learning materials

briefly and clearly, having practical value because it can be used anywhere, besides that it can also increase students' enthusiasm and interest in learning. So it can be said that flipbooks can convey material more concisely and clearly, can be accessed anywhere, and are easy to carry anywhere. Flipbook media has its own benefits for students through an attractive appearance, so that it can make students enthusiastic and active because students can participate in trying flipbook media, students find it easier to understand the material being studied, concentration becomes centered on the media so that learning becomes more meaningful and interesting (Juliani & Ibrahim, 2023). Figure 1 and 2 is a display of *flipbook* learning media in the Genetics course

Figure 1. Front Page View

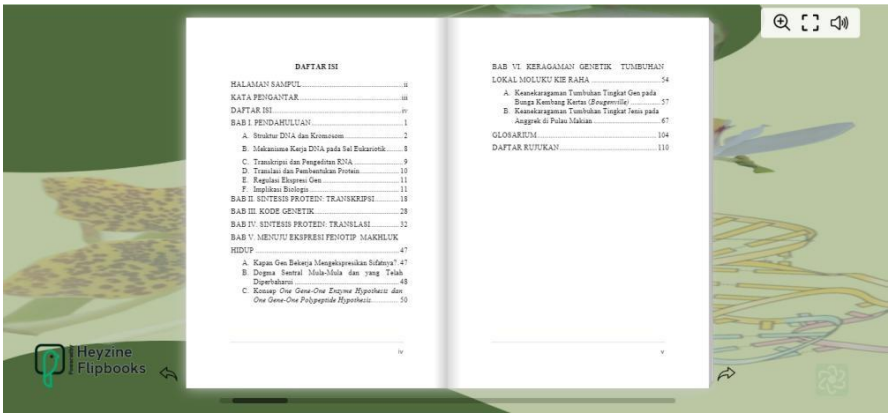

Figure 2. Table of Contents View

CONCLUSION

Based on the results of the research conducted, it can be concluded that the validity of the flipbook learning media is stated as very valid with a validity percentage by the validator in this case media, material, and language experts of 92% and 98%, so that the flipbook that has been developed into a learning media in the Genetics course is declared valid. As for practicality based on the data from the results of the validation of practicality obtained from student responses, it is included in the very practical category with a percentage of 91%, this states that flipbook media is suitable for use.

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