

# Genetics Flash Flipbook Based Improve Learning Models: The Validation of Learning Media in University

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**Abstract-** The learning system in Indonesia should attend the developments and the changed of the 21st century by using information technology in the learning process. One of the efforts in accommodating 21st century learning at IKIP Budi Utomo Malang, especially in Biology Education Study Program in genetics subjects was the development of Genetic Flash Flipbook media with Improve learning models. This study aims to determine the properness of Genetic Flash Flipbook based Improve learning models in preservice teachers. The method used in this study was the development (R&D) method. The results showed that the validity by the material experts was very valid criteria with the percentage 89%, the results of the validity by the media experts were very valid criteria with the percentage of learning media by 88.25%.

**Index Terms-** Genetic, Flash Flip Book, Learning media, Validation

## I. INTRODUCTION

The learning system in Indonesia generally still used conventional media. The conventional media considered less attractive. Consequently, students were getting bored with monotonous and less innovative learning media [1]. Moreover, the learning system in Indonesia should attend the developments and the changed of the 21st century by using information technology in the learning process. Therefore, IKIP Budi Utomo Malang as one of the Higher Education Institutions expected to develop and carry out learning media that omitted for 21st-century life. Education in the digital era must integrated information and communication technology into all subject areas. Accordingly, to meet the challenges of education in the digital era, students must be able to communicate and adapted well. Consequently, students sued to have a higher level of thinking. The development of digitalization has a wide impact on various fields include the education field. In digital learning, the teacher must be able to use technology to support the learning process. Moreover, the learning atmosphere encourages students to make high achievements, work hard, discipline, think creatively and other high values. Optimal delivery of material needs suitable media. The media is a means of channeling messages from the teacher to the students so as to stimulate the mind, and the interests of students performance participating in learning activities [2] However, a lot of obstacles encountered during the learning process in the classroom may result in lowering students' interest and making them feel bored. Learning media has the function to improve the learning process quality that must involve students in thinking so that the learning process can be carried out [3].

One of the subjects on the Biology Education Study Program that difficult, abstract and need the use of learning media was the Genetics subject. The genetic subject now still being an obstacle in various Higher Education Institutions, because students considered genetics was difficult and hard to understand. Many researchers have shown that students have serious misunderstandings about genetics, even after instruction [4]. Also, students assumed genetic full of theoretical, less contextual, and fewer media used. Consequently, the student's understanding and concepts mastering relatively low. Most students thought that genetic was the most difficult, abstract, and frightening subject. The media used in the genetic learning process still limited, consequently the students less enthusiastic, difficult to study and less discussed with others. Based on the results of the interview with the genetic lecturers, it can be concluded that in the genetic learning process less use of learning media. Consequently, students' concept of genetic material was low. Therefore, one strategy claimed to overcome these problems and at the same time may accommodate the 21st-century learning at Genetics subject, was the development of innovative media and learning methods. That innovative media was the Genetic Flash Flipbook media-based improve learning model. This was done because genetics is known to be a subject that is at once both fascinating and difficult for students to understand [5].

Learning media was the part of learning resources, a combination of software (learning materials) and hardware (learning tools) [6]. Moreover, the use of media in the learning process becomes an effort to create more meaningful and quality learning. According to [1], the media use aims to make the learning process more appropriate and efficient. Consequently, education quality improved well. The Association for Education and Communication Technology (AECT) defines the word media as all forms and channels used

to process information. Bretz identified the main characteristics of the media into three main elements, namely sound, visual, and motion. Visuals can be divided into three, namely pictures, lines, and symbols which were a continuum of forms that can be captured by the sense of sight. Learning media was one component of learning that has an important role in teaching and learning activities. Romiszowski in Hamalik formulated the teaching media "... as the carriers of messages, from some transmitting sources (which may be a human being or an intimate object), to the receiver of the messages (which is our case is the learner).

One of the innovative media was Flash Flipbook media. Flipbook combined images intended to be inverted to give the illusion of movement and create an animated sequence from a simple, machineless booklet. Ricky Jay, 1994 stated that the idea of a flipbook that was originally only used to display animation now adopted by many vendors for various types of digital applications, such as magazines, books, comics and so on. The popular digital book design now was a digital book with a three-dimensional e-book technology known as a flipbook, where pages can be opened like reading a book on a monitor screen. Textbooks are the most important component of learning. The availability of relevant textbooks will greatly help the teaching and learning process [7].

Making flash flipbook based learning media was done by using open source software, namely the Kvisoft Flipbook Marker. The software used to make the display of books or other teaching materials into a digital electronic book in the form of a flipbook. This software used to convert PDF to flash flipbook with digital page fold effect, this page has the function of making the text and images in digital information either in swf, exe, html, e-mail format, or used as screen saver [8]. Flash flipbook was an interactive electronic book, with the advantage can loaded files in the form of videos, moving pictures, or animations and sounds, so that it will be very helpful in the learning process that can make students not felt bored in learning activities. It was different from other electronic books (e-books) which only in the form of PDF or doc files containing only text and still images. The use of flipbook maker media can increase students' learning interest and can also affect student achievement or learning outcomes. Hidayatullah and Rakhmawati stated that the use of Flipbook could increase students' understanding and learning achievement. The flipbook has the page transition effect, that was expected to attract student learning motivation so that student learning outcomes will be further improved [6].

The development of learning media could be combined with the used of learning models. This combination was expected to help students to visualize a subject matter that abstracts so that students can understand the learning material [9]. One of the learning models that appropriate with the genetic subject was to improve learning models. The improve learning model was one of the learning models based on the theory of cognition and social metacognition. This model first designed by Mevarech and Kramarsky for heterogeneous classes. This model has 3 interdependent components namely metacognitive activities, interactions with peers, and systematic activities of enrichment feedback-improvement. Improve learning model was an abbreviation of Introducing the new concept, Metacognitive questioning, Practicing, Reviewing and Reducing difficulties, Obtaining mastery, Verification, and Enrichment [10].

The steps in applying the improve learning model were as follows [10]: (1) Introducing the new concept where the teacher provides new concepts through questions that build student knowledge; (2) Metacognitive questioning, the teacher gives metacognitive questions to students about the material. Metacognition questioning was a strategy to mediate the reflective thinking and reasoning of students. The metacognition questioning strategy can help students' thinking to reflect their problem [11]; (3) Practicing, where the students practice solving problems given by the teacher; (4) Reviewing and reducing difficulties, the teacher gives a review of the mistakes faced by students during the practice; (5) Obtaining mastery, where the students do the test at the next meeting to find out the mastery of student material; (6) Verification, verifying to find out which students reach the graduation limit and which students have not reached the graduation limit; (7) Enrichment, enrichment for students who have not reached the graduation limit.

The advantages of improving learning models were (1) students more active to do exercises and students free to exploit their ideas, (2) the learning atmosphere more attractive, (3) the explanation at the beginning and the exercises make students have better understand the material, (4) encouraged students' thinking and understanding, (5) students could review the important concepts and, (6) could control and assessed student progress. The Improve learning model stimulating students to learn independently, be creative and be more active in participating in learning activities [12]. It was expected the development of learning media could be the efforts to accommodate the 21st-century learning for students of IKIP Budi Utomo Malang, especially in the Genetics of Biology Education Study Program.

## II. RESEARCH METHOD

This research was a research development known as Research and Development (R & D). This research aimed to produce a new product useful in the learning process. Developing Focus Media Parasitology using the Research and Development (R&D) method with the 4 D model (Define, Design, Develop, and Disseminate). This research started from the define stage by identifying material concepts contained in the Flash flipbook media. Then in the design phase, with designed and manufactured the Flash flipbook media. After the Flash flipbook media has been designed and created, the next step was product validation by experts and product trials in the lecture process. Based on the results of this development phase, it can be stated that the product was valid and practical.

Data obtained through questionnaire media. The type of data generated were qualitative data and quantitative data. Qualitative data collected from the suggestions or criticisms written by validators. Subsequently, the product was validated by an expert team, namely, subject matter experts and media experts. The products have been validated subsequently revised in accordance with the advice of expert media. Quantitative data derived from a questionnaire. Questionnaire answers using Likert numbers with four categories of choices namely number 4 means very good, number 3 means good, number 2 means not good, and number 1 means not good. Qualitative data analysis referred to the results of suggestions, criticisms or comments from the validator. Suggestions or comments

from the validator could be followed up or not. This follow-up depended on whether or not the repaired can be done. Quantitative data analysis performed based on the results of the instrument assessment questionnaire with a Likert scale and analyzed with percentage analysis. Based on the results of these percentage values, then compared with the level of qualification assessment to determine the criteria of the instrument and product revision requirements.

### III. RESULTS AND DISCUSSION

The results of this study were Flash flipbook media products and data description of the results of the learning media validation. In the define stage, the researcher identified the material concepts contained in Flash flipbook media. The material concept contained in Flash flipbook media was the concept of mutation, DNA repair, Genetic engineering and epigenetic. In the design phase, the design and manufacture of Genetic's Flash FlipBook based on the Improve learning model. Kvisoft Flipbook Maker was a software to make the appearance of books or other teaching materials into a digital electronic book in the form of a flipbook. This software used to convert PDF to flash flipbook with digital page fold effect [13]. The Genetic's Flash FlipBook based on the Improve learning model cover shown in Figure 1. Next, Figure 2. showed the video that inserted on the Genetic's Flash Flip Book. That video helped to introduce the concept to the student. Consequently student would more interested in the material. Figures 3 and 4 showed the step of Improve learning models such as metacognition questioning, practicing, reviewing and reducing difficulties, obtaining mastery, verification, and enrichment.



Figure 1 Genetic's Flash FlipBook based on the Improve Learning model Cover

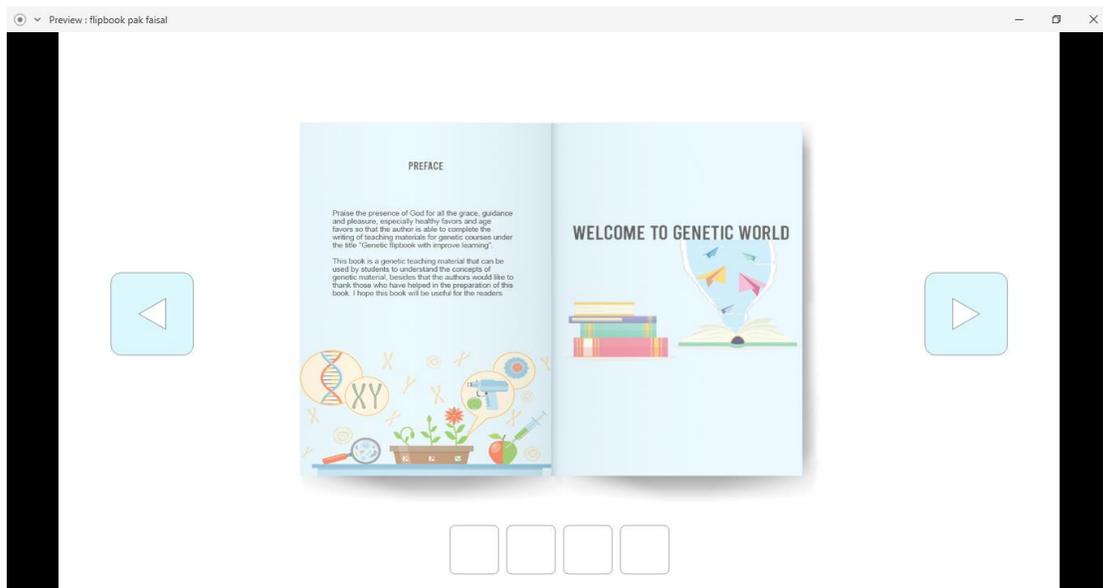


Figure 2 The Genetic's Flash FlipBook based on the Improve Learning Model that Contained a Video



Figure 3 The Step of the Improve Learning Model on Genetic's Flash FlipBook



Figure 4 The Step of the Improve learning model on Genetic's Flash FlipBook

After the Genetic's Flash Flip Book-based Improve learning model finished designed and made, the development stage was carried out namely product validation by media experts and material experts.

Table 1 The Validation Result of Material Expert

No	Feasibility Criteria	%
1	Material compatibility with competence	90
2	Material accuracy	80
3	Material update	90
4	Encourage curiosity	100
5	Presentation technique	100
6	Supporting the presentation	80
7	Presentation of learning	80
8	Coherence and chaos of thought flow	90
9	Language Feasibility	90
10	Contextual assessment	90
Average		89

Based on the data above, it is known that the results of validation by material experts were obtained 89%, then the genetic flash flipbook media with the Improve model was very suitable for use in learning. The advice given by material experts was that it needs to add some picture illustrations related to epigenetic material.

Table 2 The Validation Result of Media Expert

No	Kriteria Kelayakan	%
1	Display	96,43
2	Ease of operation	100
3	Consistency	100
4	Form	100
5	Organization	100
6	Usefulness	100
7	Effectiveness	100
8	Learning Activities	100
	Average	99,55

Based on the data above, it is known that the results of validation by media experts obtained an average of 99.55%. Consequently, the genetic flash flipbook media with the Improve model was very suitable for use in learning. The media expert validator advised to reduce the enlarged font because it was too small, the background color too brighter so it needed to match the color. From the two validators of the genetic flash flipbook media with the Improve model, it can be concluded an average of 94.28%. Consequently, the genetic flip flash book media with the Improve model was very valid. Flipbook was one type of classic animation made from a stack of paper that resembles a thick book, on each page, a process was described something that later the process looks moving or animated. In addition to the development of the media will also be combined with the use of learning models. Learning media has become one of the influential components in the success of the learning process [14]. Flipbook media as the ebook has several advantages including: can present learning material in the form of words, sentences and images can be equipped with colors so that it attracts students' attention more [15]. The technology development of digital books can drive the integration between printed and computerized technologies during the learning process [16].

The one theory that supports the Improve learning model was the metacognition theory. Metacognition was the main element in the application of Improve learning models. That because metacognition was the most important part of the order of the Improve learning model and that distinguishes it from other similar models. The success of someone in solving problems, among others, depends on the awareness of what they know and how he did it. Metacognition was a theory related to self-recognition and how he controls and adjusts the behavior. Children need to be aware of their strengths and weaknesses. Activities in the improve learning model emphasize that students can discuss with their groups in finding concepts, finding solutions to problem-solving for the success of their groups [13].

#### IV. CONCLUSION

The results showed that the validity by the material experts was very valid criteria with the percentage 89%, the results of the validity by the media experts were very valid criteria with the percentage of learning media by 88.25%. The advantage of this media was more easy to use and attractive. The lack of media still needs to be developed even better. Suggestions in this study were as follows. Flash flip book media need to develop in other subjects. Based on the results of this study, other similar studies should continue to be developed with variations in the model and the media used.

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