

## Menstrual cycle e-flipbook learning media for improving comprehension concept for 11<sup>st</sup> senior high school grade

Septi Setya Ningsih<sup>1)</sup>, Ciptono<sup>2)</sup>  
Yogyakarta State University, Indonesia

Corresponding author : [septisetya1@gmail.com](mailto:septisetya1@gmail.com)<sup>1)</sup>

**Abstract.** This study was aimed at analyzing the feasibility of menstrual cycle E-Flipbook learning media and reveal the student responses of XI<sup>st</sup> grade senior high school that used this learning media and the level of student's concept comprehension. This study was Research and development (R&D) which refers to ADDIE models. The subject of this study involved subject matter experts, media experts, biology educators and XI<sup>st</sup> high school students. The object of this research is menstrual cycle E-Flipbook-based learning media. The qualitative data consist of notes, criticisms and suggestions which were analyzed by qualitative-descriptive. While the descriptive data and quality of learning media were analyzed by calculating frequency mode. Furthermore improving of student's concepts understanding were analyzed by analysis of gain score. Assessment of student concepts by the subject matter experts stated that 98.7% of the concepts were correct. The assessment of product quality of material experts and media experts stated that the E-Flipbook 96% based learning media is very feasible to use as a learning media. Students give a positive response of 95%. While the improvement level of student's concept understanding have 0.6 gain score scale. The results showed that menstrual cycle E-Flipbook based learning media was very suitable to be used for improving the understanding of menstrual cycle mechanism concepts.

### 1. Introduction

Biology is part of the Natural Sciences (IPA), which has the study of living organisms in the context of the problems outlined in Curriculum Biological Science Study (BSCS). BSCS context problems are divided into 9 aspect, wherein the structure and function aspects of the issue has broad enough coverage. Variety is the issue of the structure and function become very important considering the existence of a structure in a living creature will be a mechanism that plays a role physiological function of the balance mechanism in living creatures. One of the important structures that play a role in the mechanism of the balance of living creatures is the reproductive structure.

The structure of the human reproductive organs in both men and women are different. However, the structure and function of the female reproductive organs has its own uniqueness. Uniqueness in egg production is the mechanism if the egg is not fertilized it will come out of the body accompanied with exuviation the inner wall of the uterus (endometrium) is called menstruation. This mechanism occurs repeatedly during a certain time limit that is generally called a cycle. So that the menstrual cycle is a process that occurs repeatedly fading inner lining of the uterus (endometrium), followed by the loss of blood vessels

by regulating hormonal mechanism. Menstruation usually occurs 11-12 years of age. The period of menstrual flow usually occurs about 3-5 days. Long menstrual cycle in humans is between 25 to 32 days and an average of 28 days [8].

Learning materials menstrual cycle in high school curriculum outlined in 2013 that are listed in the basic competencies No. 3:12 namely: "Analyzing the structure of the network constituent relations with its function of reproductive organs in the reproductive system through observation or study of literature". Facts on the ground show during this learning in school material menstrual cycle is not easily understood. As the sample is based on interviews to high school biology teachers N 1 Imogiri academic year 2017/2018 and observation of teaching and learning activities of students in class XI showed that reproductive material especially menstrual cycle is considered difficult for learners most learners.

The main factor is the material of the menstrual cycle is due to the menstrual cycle is closely related to the hormonal system that is difficult to visualize. This situation is exacerbated their hormonal feedback mechanisms so complex that hard d participants to understand learners. While the instructional media used is limited to textbooks and also *LKPD* (Student Worksheet).

This media is less provide meaningful learning for learners. Learning media are tools of teaching and learning process and serves to clarify the meaning of the message, so as to achieve the learning objectives and the means to improve the process of learning activities. One alternative media that is expected to solve this problem is the use of media-based E-flipbook.

According to [11], E-Flipbook is one type of electronic book-based learning media (digital book) or e-book (electronic book). E-Book is a traditional book with digital features. E-Flipbook media use can increase the motivation of learners because it looks more attractive than usual and more efisien books used in the computer device. So that there should be an increase in the study of students. Improved student learning outcomes is one indication of an increased understanding of the concept of learners. In studies that have been conducted using E-based learning media can improve the understanding of the concept Flipbook learners. This is shown in research [5], the use of interactive learning media based E-flipbook based etnomatika that 47.5% of students increased learning outcomes with high criteria, 52.2% of students experienced a moderate increase in learning outcomes, and no learners who have low learning outcome.

According to [9], creation of instructional media based E-flipbook multimedia premises can be done using a device software / open source software that gives developers the freedom to create applications. One such software program is a 3-D PageFlip Pro. 3-D PageFlip Pro is a software / software used to create the look of books, magazines or other teaching materials into a digital electronic book shaped fold (back and forth). This application is very easy and the ingredients to prepare a document that is used as content to create an E-Flipbook namely: \*.pdf, \*.jpg, \*.mp3, and \*.mp4 to be imported into this application software. With a wide variety of materials, written document is expected later this learning media can cover the two characteristics of the dominant learning styles on learners are visual and auditory characteristics.

Therefore, researchers wanted to conduct research under the title "Menstrual cycle e-Flipbook learning media for improving comprehension concept for 11<sup>st</sup> senior high school grade ". Hopefully, this study aims to determine the quality of E-Flipbook material menstrual cycle, know the response of learners to use E-flipbook and knowing an improved understanding of the concept of learners after using instructional media E-flipbook.

## **2. Materials & Methods**

### *2.1. Types of research*

This study was Research and Development (R & D) with the ADDIE development model. The only study conducted up to the stage of development (ADD).

### *2.2. Time and Place of Research*

Preparation of learning media conducted from January to April 2019 and the trial on 31 April 2019 in 1 Imogiri Senior High School.

### *2.3. Research subjects*

This research subject matter experts are 2 professors, 2 lecturers media experts, one high school Biology teacher N 1 Imogiri and 17 learners in class XI SMA N 1 Imogiri.

### *2.4. Research procedure*

The research was conducted through three stages as follows:

Phase analysis (analysis). The analysis phase consists of three stages: analysis of competence, analysis of the characteristics of learners and instructional analysis (analysis of learning).

The design phase (design). The design phase consists of four stages, namely the preparation of the learning module framework, systematic preparation, preparation of exercises and preparation of instructional media quality assessment instruments.

The development phase (development). The development phase consists of 7 stages: pre-formulation, formulation, editing 1, revision 1, editing 2, revision 2, and limited testing.

### *2.5. Instruments and Data Collection Techniques*

The data collection is done by using the E-Flipbook reviewer instruments, instrument response to the use of media for learners and instrument about the pretest and post-test to measure the increased understanding of the concept of learners. Data obtained in the form of assessment and feedback on the quality of the E-Flipbook and learners understanding of the concept of 11<sup>st</sup> grade class SMA N 1 Imogiri on menstrual cycle subject material.

Instrument reviewer of E-Flipbook consist of 3 instruments such as the assessment sheet material experts who assess the truth of the concept of grain indicators of the concept described, pieces of the overall assessment of the quality of E-Flipbook for matter experts by reviewing aspects of the truth of the concept, feasibility of material and presenting and sheet quality assessment E-flipbook based graphics aspects, the presentation, the feasibility of matter, truth concepts and operational systems that are intended for media experts.

Students respond to the quality of E-flipbook with through the media aspects of ease of use, ease of understanding the material of E-Flipbook, and aspects of the attractiveness of the graphics on the E-flipbook. Meanwhile, the level of understanding of the concept of measurement instruments learners using pretest and posttest matter in accordance with the basic competencies defined for chapter reproduction system namely basic competence 3:12 Analyzing the linkage structure of tissues and organs making up the reproductive system to function based on a literature study and observation. So the type of questions that tested the C4 level with the type of questions based on Bloom's Taxonomy / type of problem analysis [2] and [6].

2.6. *Data analysis technique*

There are 2 types of data analyzed in this study. The first kind of qualitative data is descriptive data obtained notes, comments and suggestions are then analyzed descriptively qualitative. This data is used as reference for the improvement of the E-flipbook. While the second type is quantitative data drawn from the results of the assessment of product quality and level of understanding of the concept of learners after learning E-Flipbook menstrual cycle material which will then be analyzed by descriptive statistics. Percentage calculations done by looking at the highest frequency of occurrence (mode) on all of the criteria that would later become the conclusions of the quality of products that have been prepared and the level of understanding of the concept of students in class X SMA N 1 Imogiri after learning to use the product. Percentage calculations done using the formula:

$$\text{Percentage of each criteria} = \frac{\text{Total Frequency of each criteria}}{\text{Total Frequency of all criteria}} \times 100$$

The products will be feasible if it has a mode with minimal evaluation criteria better. Category eligibility based on the following criteria [3]:

**Table 1. Interpretation of Criteria Learning Media Percentage**

Figures	Information
0% - 20%	Very less worthy
21% - 40%	Less deserving
41% - 60%	Pretty decent
61% - 80%	Decent
81% - 100%	Very decent

As for the response of the learning media was better learners when getting minimal results agree. As for the analysis of increased understanding concept said to have an increase in understanding of the concept after using the media when analyzed using Score Gain obtain an index of above 0.3 [7].

**Table 2. Gain Value Score Interpretation**

Value (G)	Level Relationships
$0.70 \leq g \leq 1.00$	High
$0.30 < g < 0.70$	Moderate
$0.00 < g < 0.30$	Low
$g = 0,00$	No increase
$g < -1.00$	There was a decrease

**3. Results and Discussion**

ADDIE Model in this study was restricted to the stages of ADD. The stages were carried out only up to three stages, namely Analysis (Analysis), Design (Design), and Development (Development) [1] and [13].

3.1. *The results of the analysis phase consist of the following:*

Analysis of competence. In this analysis it can be seen KI and KD subject menstrual cycle. Right KD is KD3:12 namely: "Analyzing the structure of the network constituent relations with its function of reproductive organs in the reproductive system" [4].

Analysis of Characteristics of Students. In this analysis it can be seen characteristics learning styles of students of class X SMA N 1 Imogiri. Having analyzed there are two types of learning styles were dominant on the learner include visual learning style where the dominant using eye organ with the characteristics of learning love to read and observe the image and a second type characteristic of the type of learning style audio in which predominantly using ear organs with characteristic learning listening pleasure.

Analysis of instructional (Learning). Instructional analysis is a continuation of the analysis competence and analyze the characteristics of learners. In the instructional analysis results obtained in the biology of learning is less effective because it only held 1 meetings of learning 4 plan meetings. This is due to the many incidental activities in the 2nd semester learning time to overcome the teacher just gives assignments related to the manufacture of a resume to students using learning resources such as textbooks and worksheets. But this method was considered ineffective. This is because the material menstrual cycle is very complex and difficult to visualize that it is difficult to understand as the characteristics of each student's learning style is different. The existence of learning media such as books are not able to cover the student's learning style characteristics of the dominant type of audio and visual.

### *3.2. The results of the design phase consist of the following:*

Preparation of the learning module framework. Preparation of instructional media framework is based on the approach used. The approach used in this medium is a conceptual approach which in this approach participant students are given a wide range of concepts that is composed of key concepts and sub-concepts in order to understand the mechanism of occurrence of the menstrual cycle. This instructional media framework include: Introduction, orientation problems, the core material, the cover and complementary components [12].

Phase systematic material offered. Determination systematic instructional media consists of determination the order of presentation of material and storyboard preparation of storyboard used to facilitate the process of preparation of teaching media. Storyboard is a design overview of the overall learning media to be loaded in a medium of learning. Determination of storyboard layout includes determining either the text or the image size, video sound and background.

Phase preparation exercises. Exercises that are arranged on learning media refers to indicators that have been spelled out in the basic competencies. These exercises are in the beginning of opening the media as a matter of pretest to assess how far the initial understanding of learners against the material to be studied and be in the end the media cover posttest to see how much the level of understanding of the concept of learners after learning using learning media.

Phase preparation of instrument ratings. Preparation of learning media assessment instruments used to assess the form of a questionnaire to the media product reviewer of the faculty subject matter experts, media expert lecturers, practitioners biology (biology teacher), and questionnaire responses to determine the response of students to the media

### *3.3. The results of the development phase consist of the following:*

Pre-preparation. The results of pre-preparation to study all the references that the material content of the material such modules the form text, pictures, and videos from various published sources like books or the Internet. Preparation. The result formulation is to develop learning modules products by parts are adapted to the systematics. Editing 1 and Revision 1. This is done by editing one material and expert assessment, based on the evaluation of expert lecturers following known materials.

Table 3. Assessment Truth Concept E-Flipbook material menstrual cycle

Expert content	Frequency Rate	
	Right	False
Frequency	77	1
%	98.7%	1.28%

The material on E-Flipbook material menstruation cycle around the concept of matter in the media is considered correct. Errors in the concept because of the effect on the enzyme indicator of the menstrual process needs to be done retrospect because the presence of the enzyme is in the form of hydrolytic enzymes whereabouts are still unclear explanation. The lack of explanation on the concept and then rectified to obtain the right product concept [12].

While overall, based on the results of quality assessment by expert lecturers material terms of 3 fusty among others the truth concept, feasibility and presentation of the material known materials as follows:

In the aspect of the material feasibility of obtaining materials according to expert assessment of the highest categories of good and very wellwith a percentage of 100%. This is because according to expert material this material is in accordance with the needs of competence. In the aspect of the concept of truth in the judgmentexpertmaterial gain and very good category with a percentage of 93% as according to subject matter experts within the meaning of menstrual must added due to the hormonal mechanisms that caused no convergence of the egg and sperm cells. Aspects of the presentation according to expert assessment of material gain and very good category with a percentage of 95.8%. This aspect get 95.8% votes for the presentation of the menstrual cycle chart schemes need to review the process of hormone synthesis mechanism. This is related to the feedback mechanism described at the material feared could cause misconceptions on the learner. So when it is inferred based on the merits of the material terms of this media get media eligibility percentage of 94.81%.

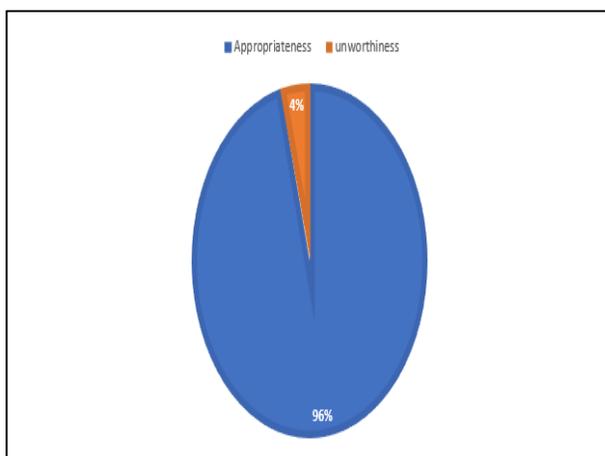


Figure 1. Percentage of eligibility and ineligibility media expert review materials based on three aspects (Blue: Very good, Brown: Good).

Meanwhile, based on the results of E-Flipbook quality material menstrual cycle by media expert lecturers based on 5 votes graphics aspects namely, the presentation, the truth of concepts, language, and the operating system known as follows.

In the graphics aspect media experts provide the assessment categories and very good category with a percentage of 100%. According to media experts graphics ratings shown in this medium in the form of

votes layout elements, color selection, font size, font type and use bold and italics, spacing between letters and lines is in accordance with the indicators raised. In this presentation aspects of media experts provide categories of good and excellent ratings with a percentage of 92%. In this presentation aspect ratings gain percentage of 92% due to an indicator of concept maps, less appropriate concept of the menstrual cycle so that the necessary repairs by constituent. In the aspect of the material feasibility media experts provide categories of good and excellent ratings with a percentage of 100%. Just as matter expert assessment by the media has a very decent material used for learning for learning according to indicators that have been mentioned. In this linguistic aspect of media experts provide ratings for this instructional media for good and excellent categories reached 100%. This is because the phrase used in the media does not lead to a double interpretation, the sentence structure in accordance with the rules of writing sentences in Indonesian. In the aspect of media experts operational system provides ratings for this instructional media for good and excellent categories reached 89%. In the aspect of the operational system is getting assesses the operating system with a percentage of 89% as there is little problems that use this medium which is to open this media takes approximately 15 seconds so the advice of an expert to repair the installation media to accelerate the opening of this learning media. So when it is inferred based on the feasibility of the media in terms of this media get media eligibility percentage of 96%.

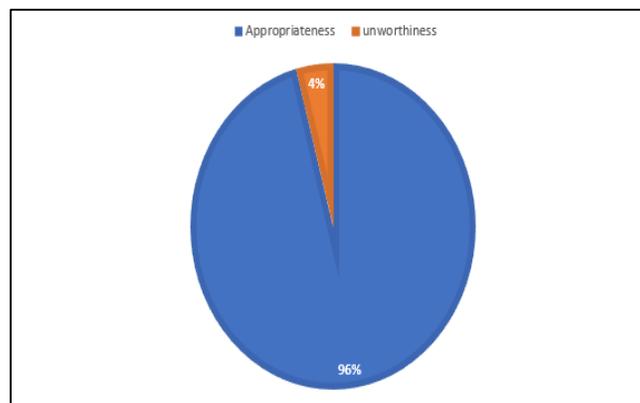


Figure 2. Percentage of eligibility and ineligibility media expert review based on five aspects of the media (Blue: Very good, Brown: Good).

According to media expert assessment, instructional media material menstrual cycle fit for use and can be tested in schools by improvement in the form of expert advice and input from the media. It is known through the mode that appears on every aspect has a good category.

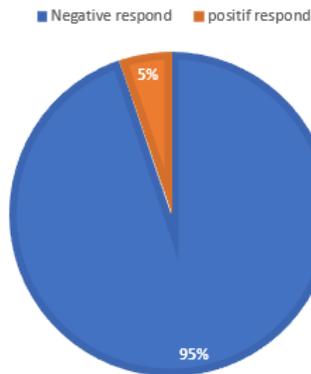


Figure 3. The response of students to the use of media (Blue: Very good, Brown: Good).

Based on the results of learners overall feedback on this medium as much as 94.84% of students responded positively to the use of instructional media and 5.13% of students gave negative responses to the use of this medium. As for the results of an increased understanding of the concept participant children after using media obtained the following results:

Value	<i>Pretest</i>	<i>Posttest</i>	<i>Gain Score</i>	Criteria
Average	32.4	66.2	0.6	moderate

There is an increased average number of pretest and posttest were analyzed Score Gain Normalization analysis. This is evidenced by the increase in the average value of pretest and posttest 35.8 and analyzed using gain score suggested an increase of 0.6 means moderate category. This situation is in accordance with previous studies conducted by [7], said that based on research conducted differences are increasing between the study of students who use the media E-Flipbook with the study of students who use the media guide to print on materials biodiversity in Indonesia. This increased difference because students have interest in learning tends to increase with digital books that can be used with various devices and have many media content that can add variety to learn and in accordance with the characteristics of the study. This category is based on the pretest results with an average value of 55 to 75 at posttest results in the medium category. As for the printed book has a pretest result average value of 45 to 66 on the results of the posttest and the middle category [3].

#### 4. Conclusion

Based on data analysis has been carried out, it can be concluded that :

Feasibility study media based E-Flipbook material menstrual cycle is otherwise very feasible to use learners in high school. The response of students to instructional media menstrual cycle based E-Flipbook prepared for 11<sup>st</sup> grade class learners get a very good response. There is an improvement of concept understanding of learners before and after using instructional media based E-Flipbook that have 0.6 Gain Score index.

### **Suggestion**

Preparation of instructional media is limited only to the stage of development (D2), further research is expected to continue research with the phases of implementation (I) and evaluation (E). Researchers conducting the study was limited to one school, so learning media should be trialed for more than one school in order to be used in other high schools with a large scale.

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