Development of UKBM Based on EPUB (Human Digestive System Topic for XI Class)

Novela Memiasih [a,] *, Murni Sapta Sari [b], Triastono Imam Prasetyo [c], I Wayan Sumberartha [d]

[a,b,c,d] Department of Biology,

Universitas Negeri Malang, Malang, Indonesia

**Corresponding author's e-mail: novelamemi4@gmail.com*

Abstract

In this globalization era, information is very easy to obtain, therefore critical thinking skills are important for students to have because they can train students to filter the information obtained to solve a problem. The purpose of this research is to produce a product in the form of UKBM based on ePUB on digestive system topic to improve critical thinking skills and cognitive learning outcomes of students who have been tested for validity, practicality and effectiveness. The development model used in this study is the ADDIE development model. The study was conducted at SMA Negeri 5 Malang with the research sample being students of class XI. Research data in the form of the results of the validation of media experts, topic experts, assessment experts, field practitioners, student responses, pretest and posttest results of students. The results showed that the average percentage of validated ratings of media experts, topic experts, assessment experts, field practitioners were 96.74%, 100%, 100%, and 94.23%, all of which were in the very valid category. The practicality test value is 92.53% which means it is very practical, the value of the effectiveness test is 0.8 which means it is classified as very effective, the results of students critical thinking skills are 82.16 which means it is classified as very critical, and the cognitive learning outcomes of students 93.42 which means it is classified as high. Based on the results of the study it can be concluded that the development of UKBM based on ePUB can improve critical thinking skills and students cognitive learning outcomes.

I. Introduction

Critical thinking is a student's skill to get answers or conclusions [1]. Indicators of critical thinking skills are divided into five groups as follows: 1) elementary clarification, 2) basic support, 3) inference, 4) advanced clarification, and 5) strategies and tactics [2]. Critical thinking skills are important for

students to have in this era of globalization, coupled with today's digital era, students find it easier to obtain information [3]. The ease with which students obtain information needs to be balanced with the ability of critical thinking skills so that students can sort out relevant and accountable information for its source. Based on the results of a survey of students, which was conducted by giving a questionnaire containing questions that were in accordance with the indicators of critical thinking, the average student at SMAN 5 Malang still had critical thinking skills with a value of 55. A score of 43.75-62.50 indicates that student's critical thinking skills still in the less critical category. Several groups of critical thinking indicators are still in the low category, namely basic support, inference, advanced clarification, and strategies and tactics.

Learning outcomes are the results that have been achieved by students during the learning process [4]. Based on the results of interviews with biology teachers at SMAN 5 Malang, class XI learning outcomes often decline on the topic of the human digestive system. Student learning outcomes decrease because students have difficulty learning the bioprocess of the digestive system and its constituent tissues, this is because this topic needs to use graphic visualization [5]. The teaching materials that is most often used is Unit Kegiatan Belajar Mandiri (UKBM) which in English is called "Independent Learning Activity Unit". UKBM is a small unit of study arranged in sequence from easy to difficult [6], but in its application there are still many obstacles that are found by teachers. Based on the survey results, most students felt that biology was difficult to understand because a lot of memorization and learning biology in the classroom felt boring because the teacher only gave lectures and the media presented was not interesting. One of the teaching materials that teachers can use is digital teaching materials using ePUB. EPUB is a type of e-book with an open standard that allows many parties to develop reader applications, development applications and other assistive applications. EPUB can load images, audio, animation, video, and web links, making them more efficient than conventional books. This UKBM can be accessed via smartphones and laptops so that students can study anytime and anywhere, this can encourage students to learn independently in understanding a topic [5]. In addition, with the existence of this UKBM based on ePUB, students do not need to print thick and expensive UKBM and there is no more reason for UKBM to be left behind.

II. Method

This development model uses the five stages proposed by Branch namely analyze, design, develop, implement, and evaluate [7]. This development model is known as the ADDIE model. The types of data contained in this research are qualitative data and quantitative data. Qualitative data are in the form of comments from media experts, topic experts, and students regarding UKBM based on ePUB during validation and trials. Quantitative data are obtained from the results of media assessments by

validators and users (students) with a rating scale that has defined criteria. The data collection instrument consisted of instruments of the validity, practicality and effectiveness of UKBM based on ePUB material on the human digestive system. A summary of the data collection instruments can be seen in Table 1.

Table 1.
Data Collection Instruments

Aspects Assessed	Instruments	Respondents
Product validity	Media validation questionnaires, topics, assessments, and field practitioners	Validators are media experts, topic experts, assessment experts and research class teachers
Product effectiveness	Pretest and posttest	User (students)
Product practicality	Student response questionnaire	User (students)
Critical thinking skills	Pretest and posttest	User (students)
Cognitive learning outcomes	Pretest and posttest	User (students)

At the implementation stage, the UKBM based on the ePUB was piloted on a large scale. At the implementation stage, the developer teaches the class with the human digestive system topic. Quantitative data in the form of analysis results from expert validates calculated using a formula according to Akbar then the results of the analysis are classified by validity criteria consisting of very valid, moderately valid, less valid, and invalid criteria [8].

Student responses to the use UKBM based on ePUB are in the form of qualitative data. To find out the practical value of this media, qualitative data from student responses is converted into quantitative data using a formula according to Riduwan and then classified by product practicality criteria consisting of criteria very practical, practical, quite practical, impractical, and very impractical [9].

The UKBM based on ePUB effectiveness test was obtained from the results of the pretest and posttest and calculated using the gain score and then classified by the product effectiveness criteria consisting of high, medium, and low criteria [10].

III. Results and Discussion

A. Result

Validity or feasibility is determined using the results of validation by media expert validates, topic experts, assessment experts, and field practitioners, namely the biology subject teacher in SMAN 5

Malang. The average percentage of the evaluation of media expert validates, topic experts, assessment experts, and field practitioners were 96.74%, 100%, 100%, and 94.23%, all of which were in the very valid category.

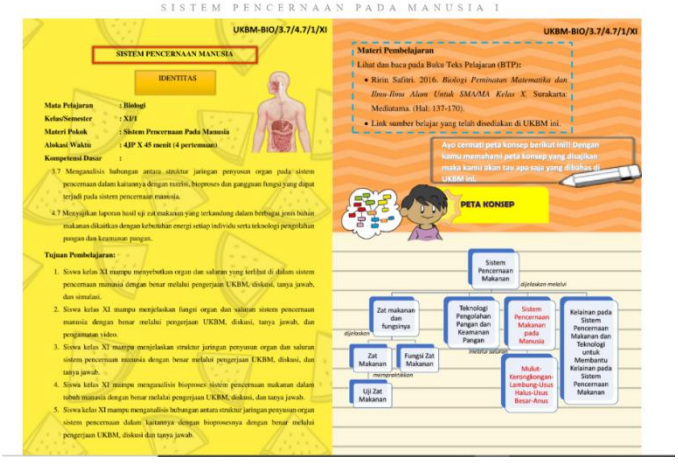
The effectiveness of UKBM based on ePUB can be determined by the gain score formula. Based on the gain score formula, the result is 0.80 which indicates that the effectiveness criterion is high. Student learning outcomes can be seen from the results of working on 10 items in the form of multiple choices. At the time of the pretest the average score obtained by students was 52.57 which was classified as moderate [11] and increased during the posttest with an average score of 93.42 which was classified as high.

Student's critical thinking skills are determined by assessing the results of student's answers from the 5 item descriptions using a critical thinking assessment rubric. Based on the calculation, the average value during the pretest is 41.8 which is classified as very less critical [12] and increases at the time of the posttest with an average value of 82.16 which is classified as very critical on each indicator, namely 1) elementary clarification, 2) basic support, 3) inference, 4) advanced clarification, and 5) strategies and tactics.

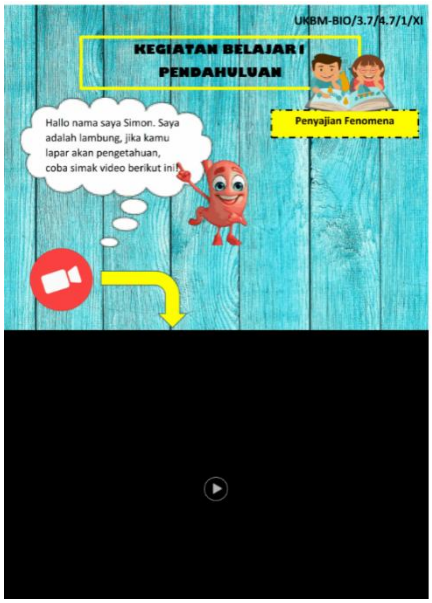
The practicality of UKBM based on ePUB can be determined using a questionnaire given to students. The average percentage of the UKBM practicality result of the digestive system topic is 92.53% which has very practical criteria with information that can be used and reviewed.

Some display of UKBM based ePUB can be seen in Figure 2.

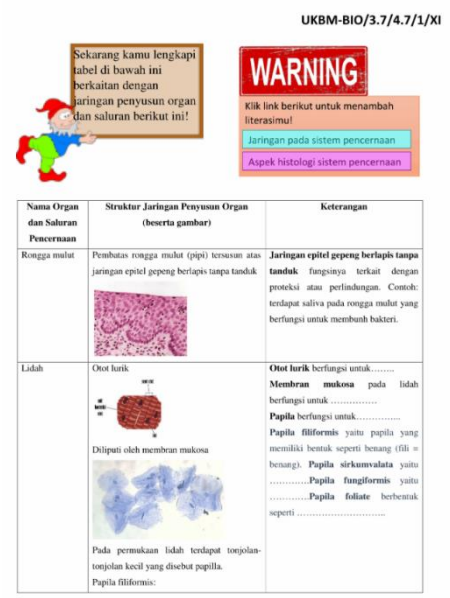
(a)



(b)



(c)



(d)

Figure 1. Display of UKBM based on ePUB (a) UKBM cover, (b) UKBM identity page and concept map, c) video presentation page showing video, (d) learning activity page supported by pictures and learning links

B. Discussion

The UKBM based on ePUB is suitable for use in the learning process. Evidence from the assessment of media expert validates, topic experts, assessment experts, and field practitioners, all of whom are in the very valid category. The results of the effectiveness test and high learning outcomes indicate that this UKBM helps students understand the learning process of the human digestive system topic. Students can access material on the human digestive system in accordance with basic competencies and indicators which include the organs and tract of the digestive system, digestive system bioprocess, the tissues that make up the organs of the digestive system, the relationship between the tissues that make organs and their bioprocess, disorders that occur in the digestive system, and the nutrients contained in the food material.

Critical thinking skills are classified as very critical because learning with multimedia can help improve student's critical thinking skills than learning without multimedia [13]. Apart from the influence of the media, the guided inquiry learning model syntax contained in UKBM also plays a role in improving student's critical thinking skills. Guided inquiry learning model can improve student's critical thinking skills because students are invited to be active in learning and confident in their intellectual abilities [14].

UKBM based on the ePUB is very practical because the learning media is very helpful during the learning process and makes it easier for students and helps students understand. Many students found

this UKBM based on ePUB fun to use. During the learning process, students can see videos related to the topic being discussed and students also find it easier to understand the topic because there are various supporting images such as images of the tissue making up organs in the digestive system and other pictures. This is also supported by existing learning activities at UKBM such as simulations and practicum activities that can increase student's motivation and understanding of the human digestive system topic.

IV. Conclusion

This developmental research resulted in a product in the form of a UKBM based on ePUB which was tested for its validity, practicality and effectiveness. The developed UKBM contains human digestive system topic for XI class, which consists of learning activities one to three learning activities using the guided inquiry learning model syntax. This UKBM based on ePUB is equipped with videos, pictures, animations, and links to learning resources and makes it easier for students because students don't need to print thick UKBM anymore. The results of validation, effectiveness testing, high practice tests as well as increased critical thinking skills and student learning outcomes prove that UKBM based on ePUB is suitable for use in the learning process.

This UKBM based on ePUB can also be balanced with Google spreadsheets if you don't want to use paper and can be done in groups at the same time so that this UKBM can be used anytime and anywhere. Besides having the benefits of this UKBM based on ePUB, it also has weakness, namely to open learning links for smartphones or laptops, you must connect to the internet. You need to download the application to open the ePUB format so it requires sufficient memory capacity. To operate a UKBM based on ePUB requires a smartphones with special specifications, meaning that it must be Android or IOS with a minimum RAM of 3 GB.

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