



## Feasibility of e-booklet learning media on the concept of human reproductive system



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### ABSTRACT

Educators are the major players in the teaching process to enhance the accomplishment of student learning results. Biology subject, mainly the concept of Human Reproductive System, necessitates media relevant to learning objectives, student conditions, and technology development. Hopefully, learning media can assist the learning process by being packaged attractively to reach learning standards. In this case, the selected form of learning media is E-Booklet. This study aims to describe the feasibility of E-Booklet Learning Media in Concept Human Reproductive Systems. The research technique involves the step-by-step study and development utilizing a 4D model: 1) define, 2) design, 3) develop, and 4) disseminate. The feasibility of the E-Booklet has indicated the results of testing by 3 (three) experts using a feasibility instrument. The Human Reproductive System E-Booklet test shows that the results are very feasible (4.49) utilized as a biology learning medium. The dissemination of E-booklets is done online through posters that contain links and barcodes of E-booklets that can be accessed via the internet.

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### INTRODUCTION

The interaction of students and educators with various learning tools in the learning environment is characterized as learning. The 2013 curriculum used today adopts a 5-step scientific approach that includes the steps of observing, asking, trying, reasoning, and communicating (Maulina et al., 2018). In the learning process, educators carry out processes and evaluations that adopt 21st-century learning, which is implemented in 21st-century learning and can be developed through 4 abilities, namely, (1) Problem Solving & Critical Thinking; (2) Communicate; (3) Collaboration; and (4) Innovation & Creativity (Ramdani et al., 2019).

Several factors greatly influence efforts to improve the achievement of learning outcomes and learning objectives. These factors consist of internal factors and external factors. Internal factors include physiological & psychological students, while external factors include environment & instruments (such as facilities, learning tools, teachers, etc.) (Sabri, 2010). The vital role of educators is to help improve student learning outcomes to the maximum by providing various learning resources (Rijal, 2018). The development of creativity and innovation can be done by using technology. By applying technology in education, the learning atmosphere can be more fun, effective, and efficient to maximize the results.

In the digital era, various information is easily obtained through the internet, accessing various gadgets. The use of devices such as gadgets is currently widely used in the field of education. Students can use gadgets to make it easier for them to obtain knowledge and subject matter effectively and efficiently through the internet (Putra, 2017). One of the learning resources that can be chosen is learning media.

Media is described as a means that acts as an intermediary in conveying material from educators to students. Educators may use the media to manage the learning environment and improve interaction among teachers, students, and their learning environment (Karo-Karo & Rohani, 2018). Learning can be optimized with media that are relevant to learning. The use of learning media in schools uses many textbooks. Students consider textbooks boring because they contain much writing and are less attractive, so their reading interest is low (Zahora & Saparso, 2021). So, it is necessary to make an effort to create media that triggers the interest & interest of students to learn it. Learning media in the form of books, such as an E-Booklet, might be an alternative. The booklet contains clear, firm, attractive, and easy-to-understand language and contains many pictures that can concretize the material to shape students in understanding concepts (Imtihana et al., 2014). Furthermore, Ruddamayanti (2019) explained that E-Booklets could be accessed through gadgets easily without limitations of space and time.

Depending on the outcomes of a student needs assessment issued to SMAN 8 Banjarmasin students in class XII science, the media students often use is textbooks. The media is considered to have a dull appearance and sentences that are difficult to understand, even though the explanation is full. In biology learning, generally, almost all students have never used an E-Booklet. Students choose the Human Reproductive System concept in even semester biology subjects considered challenging to learn because the discussion uses language and organ structure that is difficult to understand using Latin terms and requires a deep understanding of sex cell formation. This material is classified as partly quite abstract and complex because it includes organ systems that are difficult to observe directly. Students' understanding of the material is less than optimal (Syahdiani et al., 2015). Based on this explanation, the researcher is eager to do a study that will describe the Feasibility of E-Booklet Learning Media on the Concept of Human Reproductive System.

## RESEARCH METHODS

### Research Design

This study's approach involves research and development utilizing a 4D model, which comprises the following stages: 1). Define, 2). Design, 3). Develop, and 4). Disseminate according to Thiagarajan et al. (1974), but in this study, the dissemination is done simply and limited to SMAN 8 Banjarmasin. The goal of the define (1) step is to specify and define the instructional needs. The first phase is primarily analytical—objectives and restrictions for the learning media based on Thiagarajan et al. (1974). The goal of the design (2) stage is to create prototype instructional content. This phase begins once the behavioral objectives for the educational content have been determining. The primary components of the design stage are the selection of media and formats for the material and the creation of a first edition. Stage (3) Develop consists of expert

review in which there is a feasibility test and continued in stage. And the goal of the last stage, the disseminate (4) the learning media reach their final production stage when developmental testing yields consistent results and expert appraisal yields positive comments. The three steps in this stage are shown. Special efforts are required to distribute the learning media widely among the teachers and learners and encourage the adoption and utilization of the materials.

### Population and Samples

The population of this study is all the learners of XII MIPA students of SMAN 8 Banjarmasin. While there are two types of samples in this study, 1) experts and 2) learners. The experts are in charge of evaluating the E-Booklet so that the level of feasibility can be stated. The experts in this study numbered three people. The two people are PMIPA FKIP ULM Banjarmasin Biology Education Lecturer and one biology teacher class XI MIPA. They were selected because their educational background was highly relevant to this study. While learners play a role in filling out the needs questionnaire.

### Instruments

There are three types of instruments in this study: the questionnaire interviewing the needs of teachers, the needs of learners, and the feasibility test. Questionnaires of teacher needs and the needs of learners were made so that researchers could analyze and adjust the types of learning medium and concepts by the requirements of teachers and learners. There are 16 questions on the teacher needs questionnaire and 19 questions on the learners' needs questionnaire. Then the feasibility test instrument was made to measure the level of feasibility of the developed product. The feasibility test instrument was completed according to Thiagarajan et al. (1974), which was then adapted to the research needs. There are a total of 15 aspects that are assessed by experts or validators.

### Procedures

The development procedure in this study refers to a 4D model that includes the steps of Define, Design, Development, and Disseminate. The research began at the define stage by analyzing the questionnaire of teachers' needs to know the fundamental problems in the development of E-Booklet as a medium of learning the Reproductive System in Humans. At this stage, alternative solutions emerge so that it is easier to determine the initial steps in the development of appropriate media. It is continued by analyzing the needs of learners for Biology learning media by using questionnaires to learners so that data can be obtained on the characteristics of learners. This analysis is done by considering learners' characteristics, abilities, and experiences, including academic ability, age, and motivation for the subject. Then analyze and review the 2013 Revised Curriculum Syllabus and the applied Semester Program. Then, it examines the primary material contained in the Curriculum Syllabus and the depth of the package book material used by teachers and learners. After performing various analyses, it is continued by formulating Competency Achievement Indicators (GPA) according to the Basic Competencies in the selected Concepts.

After the define stage, it continues with the design stage. In this stage, the necessary instrument is designed, which is the E-booklet feasibility assessment instrument. Next, the selection of media that adjusts to the analysis results of learners, tasks, and concepts. In this case, the type of media chosen is E-booklet. Then proceed with the selection of the format. The developed format adapts to the analysis that has been done at the define stage. After that, the initial design is made, which becomes Draft I or prototype- this Draft I will be assessed by the experts.

After that, proceed with the development stage. At this stage, a qualification test is conducted by three expert reviewers using a qualification instrument. From this test, qualitative and quantitative data will be obtained that can be used as a reference for the improvement and refinement of development products. If the product is declared highly feasible, then it can be extended to the dissemination stage. However, if the opposite is the case, it is necessary to make significant improvements to the product.

The last stage in this research is the disseminate stage. At this stage, the revised E-booklet is distributed. In this study, the researcher limited the dissemination only by conducting simple dissemination and limited only in SMA Negeri 8 Banjarmasin, the place of research. Next, the E-Booklet learning media link and the barcode the E-Booklet was distributed in the form of poster to SMAN 8 Banjarmasin. Dissemination in the form of a posters is intended so that teachers, learners, and school residents can access the E-Booklet. The dissemination phase is performed to socialize a limited number of development products to teachers and learners as users, whether individuals, groups, or systems (Thiagarajan et al., 1974).

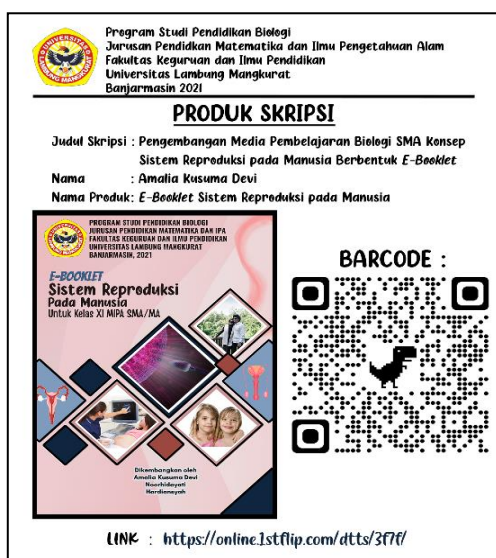


Figure 1. Poster of E-Booklet

### Data Analysis

Data analysis includes the results of feasibility tests performed. The assessment instrument is made in the form of a written questionnaire. It uses a Likert scale includes the highest score is five & the lowest is one. The questionnaire results using the rubric provided along with the score obtained based on the results of the answers to the questionnaire. To determine the feasibility of the development's outcomes through the computation of scores utilizing the Purwanto (2020) formula:

$$M = \frac{\sum X}{N}$$

Description =

M : score each aspect;

$\sum X$  : total score obtained;

N : many aspects

The results of the feasibility test, which are known to have an average score, can be matched with the criteria adapted according to Widoyoko (2020), including the average score:

**Table 1.** Category of Feasibility

No	Range Score	Feasibility Category
1	$X > 4.20$	Very Feasible
2	$3.40 < X < 4.20$	Feasible
3	$2.60 < X < 3.40$	Feasible Enough
4	$1.80 < X < 2.60$	Less Feasible
5	$X < 1.80$	Very Less Feasible

## RESULTS

The following are the results of the Feasibility of the E-Booklet by three expert review who evaluated the Feasibility questionnaire. The questionnaire used consists of 15 aspects with a score range of 1 to 5. The suitability test is a step to describe the objectivity and content of the learning media in the form of an E-Booklet. The summary is shown in Table 2.

**Table 2.** E-Booklet feasibility test results

No	Aspect	Score			Average Score
		AI	A2	A3	
1	Completely compiled E-Booklet	4	5	5	4.67
2	Availability of additional material following the concept	5	4	4	4.33
3	E-Booklets can be used repeatedly	5	4	5	4.67
4	Requirements available (Instructions for use, the identity of learning objectives; Indicators of Competency Achievement; Basic competencies; Core Competencies)	5	5	5	5.00
5	The scope of learning materials available	4	5	5	4.67
6	E-Booklet usage time allocation is available	4	5	5	4.67
7	E-Booklet can be used independently	4	4	5	4.33
8	Meeting scheduling available in E-Booklet	4	4	5	4.33
9	E-Booklet production costs	4	4	5	4.33
10	E-Booklet usage guide for teachers	4	5	5	4.67
11	Procedure for using E-Booklet	5	4	5	4.67
12	Ease of use of E-Booklet	4	5	5	4.67
13	Special knowledge is required in the use of E-Booklet	4	4	3	3.67
14	Possibility of receiving the E-Booklet by the teacher	4	4	5	4.33
15	Possibility of receiving E-Booklets by students	4	4	5	4.33
Score results		64	66	72	67.33
Feasibility score results		4,27	4,40	4,80	
Average score					4.49
Conclusion					Very Feasible

Based on the outcomes, it is evident that the E-Booklet created is "Very Feasible," as seen by the three experts' average feasibility score of 4.49. Furthermore, based on the evaluated elements, it was stated that the construction of the E-Booklet learning medium was extremely technically viable to be used in the learning process. From the feasibility test carried out, input, comments, and suggestions were obtained, which were used as a reference for improvement/revision of the E-Booklet. The results of the revisions/improvements made are displayed in Table 3.

**Table 3.** Results of revision/improvement of E-Booklet Learning Media

No	Suggestion	Revision
1	For the use of e-booklets to be safer, it is better to store them in online storage.	Save e-booklet files into online storage such as google drive
2	The learning objectives must contain ABCD, in the booklet there is no Condition. Complete it	Improve the learning objectives by adding the Condition
3	The use of booklets needs to be developed with more videos on the latest materials and info.	Adding video and up-to-date info in e-booklet

## DISCUSSION

The feasibility test is a step to describe the developed e-booklet learning media that can be applied in Biology learning. This feasibility test is conducted by testing the e-booklet with a feasibility instrument filled out by three experts in this study. The feasibility test of the E-Booklet contains 15 aspects that are based on Thiagarajan et al. (1974) and are adapted to the demands of researchers. The feasibility test is helpful to determine whether the feasibility results can be applied as a learning resource (Thiagarajan et al., 1974).

The E-booklet learning media is designed with the human reproductive system concept taught in class XII of high school. This media is designed to adapt to students' needs, the needs of teachers, the curriculum applied, and the learning objectives that students must achieve. The e-booklet framework developed includes (1) Front Cover; (2) Foreword; (3) Table of Contents; (4) List of images; (5) Instructions for Use; (6) Identity of learning objectives; Indicators of Competency Achievement; Basic competencies; Core Competencies; (7) Material scheduling and Mapping; and (8) Concept maps; (9) Material Introduction; (10) Presentation of Material; (11) Summary; (12) Evaluation Questions; (13) Bibliography; (14) Glossary; (15) Author Profile; and (16) Back Cover. The front cover and back cover can be seen in figures 2 and 3.

**Figure 2.** Front Cover of E-Booklet**Figure 3.** Back Cover of E-Booklet

The feasibility test assessment is carried out by supervisors 1 and 2 from Biology Education PMIPA FKIP ULM Banjarmasin and one teacher teaching biology class XI MIPA. There are a total of 15 aspects that become the benchmark for assessment in the e-booklet feasibility test, which includes aspects of (1) Completely compiled E-Booklet; (2) Availability of additional material following the concept; (3) E-Booklets can be used repeatedly; (4) Requirements available

(Instructions for use, the identity of learning objectives; Indicators of Competency Achievement; Basic competencies; Core Competencies); (5) The scope of learning materials available; (6) E-Booklet usage time allocation is available; (7) E-Booklet can be used independently; (8) Meeting scheduling available in E-Booklet; (9) E-Booklet production costs; (10) E-Booklet usage guide for teachers; (11) Procedure for using E-Booklet; (12) Ease of use of E-Booklet; (13) Special knowledge is required in the use of E-Booklet; (14) Possibility of receiving the E-Booklet by the teacher; (15) Possibility of receiving E-Booklets by students. From the feasibility test carried out, comments and suggestions were obtained, which were used as a reference for improving the E-Booklet. According to Isnaini (2014), evaluation or assessment is needed to determine the quality of these learning resources in developing learning resources.

The development e-booklet has several features that make this product attractive, including presenting systematic material supported by clear images/illustrations, equipped with video, color combinations that are applied together, and additional components to support materials such as scheduling and mapping. Materials, concept maps, evaluation questions, additional information, and questions can stimulate students to think. The information in the E-Booklet is structured and adjusted in line with the syllabus and textbook order, allowing it easy for the reader to study (Magdalena et al., 2020).

In the E-Booklet, images, illustrations, and videos of supporting material are presented to make it easier to reach. These components can cause the senses to interact, allowing pupils to understand biological material more efficiently (Puji et al., 2014). This e-Booklet is equipped with several features that help understand the material, such as search and download buttons. This E-Booklet product can be downloaded to be used in unfavorable conditions such as an unstable network. With the development of technology, electronic media are effective, practical, and efficient, streamline learning time, increase student activity, and allow it easy for the reader to study (Azizah et al., 2017). E-booklets are easily distributed via the internet, of course; therefore, the distribution of these E-booklets can be quickly done (Makdis, 2020).

The E-Booklet contains scheduling and material mapping as well as concept maps. Scheduling and mapping of materials is a crucial component that might aid in the consistency of the learning process. The presentation of systematically organized material can improve learning and increase their understanding (Syaifullah & Izzah, 2019). Concept maps contain subject matter that is described as interrelated so that it helps students understand, remember, memorize, and make it easier to take notes (Hidayah, 2019). The display of Material Mapping and Concept Maps can be seen in Figures 4 and 5.

**Penjadwalan dan Pemetaan Materi**

Portemuan Minggu ke	Alokasi Waktu	Materi
1	4 JP	1. Struktur dan fungsi organ penyusun sistem reproduksi manusia 2. Hormon kelenjar pada manusia 3. Spermatozoa dan kelenjar
2	4 JP	1. Siklus menstruasi 2. Pembuahan, kehamilan, dan kelahiran 3. Laktasi
3	4 JP	1. Tajadubro atau oembah 2. Gangguan sistem reproduksi pada manusia 3. Teknologi sistem reproduksi pada manusia 4. Metode kontrasepsi

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Figure 4. Material Mapping



Figure 5. Concept Maps

The e-Booklet that has been developed also contains evaluation questions and much additional information related to the material. Evaluation questions can be used to instruct and assess students' knowledge of a subject (Hanif et al., 2016). The additional information presented contains much material that is easy to find in life and the surrounding environment to increase understanding and knowledge. In learning biology, it is necessary to present facts, examples, and real-world problems from students' lives to be able to master concepts and apply them better in everyday life (Supiandi & Julung, 2016).

In addition, many simple questions aim to stimulate students' Critical Thinking Skills (CTS). The questions referred to the stages of the scientific approach, namely 5M and critical thinking (Shanti et al., 2017). Students' critical thinking skills can be stimulated by asking questions, encourage thinking and asking questions, and enable them to find information and make decisions in problem-solving.

According to the feasibility test findings, the element of "required special knowledge in the use of E-Booklets" received the lowest score. It is because the developed E-Booklet is converted into a flipbook. Therefore, several menus may be found less often in other learning media. The use of media-based technology in education aims to improve the efficiency and functionality of the learning process. However, the teacher has not utilized it optimally because he has not mastered the available menus (Poerwanti & Mahfud, 2018). Optimization of utilization can be done by habituation using technology-based learning media such as E-Booklets that have been developed or other technology-based learning media.

Then the aspect that gets the highest score is the aspect of "Availability of requirements (instructions for use, the identity of learning objectives; Indicators of Competency Achievement; Essential competencies; Core Competencies)." Core competencies, essential competencies, indicators of competency achievement, and learning objectives must be aligned with the primary material expected to be achieved by students. Therefore, learning media development should be guided by these four components (Muaripin, 2018). The harmony of the material presented following the four components above can be considered a guarantee of achieving learning outcomes and vice versa. If the material is prepared, not referring to these four things, the learning outcomes obtained are less than optimal—the development of learning media demands evaluation to determine the learning media's quality. The presentation's completeness is one of the indicators evaluated (Isnaini, 2014).

In the E-Booklet feasibility test, several suggestions for improvement were obtained, including online storage, improvement of learning objectives, and the addition of videos and up-to-date information. Based on these suggestions, improvements were made. E-Booklet files are stored in Google Drive for safer storage and more accessible access without any space and time limitations with internet access. Then the addition of the latest information to increase knowledge about the concepts studied. The information presented is related to activities or events often encountered in the surrounding and daily environment to learn how topics are used in actual life. The next suggestion is to change the photo into a video to explain the process. Yunita and Wijayanti, (2017) explained that video media could increase students' curiosity and understanding of the material. The achievement of learning objectives and increasing understanding is also expected to be achieved well with video media in learning media

## CONCLUSION

Feasibility of the E-Booklet Learning Media Concept of Human Reproductive System is stated with "very feasible" criterion with a median score of "4.49". These results indicate that developing an E-booklet as a medium for learning biology is "very feasible.". Considering that the

e-booklet on the Human Reproductive System has been declared very feasible, further research should proceed with other tests such as suitability testing and development trials on students and can be applied in biology learning to determine its effectiveness

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