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Development Of Scientific Literacy-Based Adolescent Reproductive Health Flip Book For ITS PKU Muhammadiyah Surakarta Health Students

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ABSTRACT
This study aims to develop a science literacy-based Adolescent Reproductive Health Flip Book media. This research is a type of development research (R&D) using the Borg and Gall model with four stages, namely introduction, development stage, testing and dissemination stage. In this study, the validators were material and media experts. This trial involved students and lecturers from the Midwifery and Anesthesiology Nursing Study Program of ITS PKU Muhammadiyah Surakarta in the academic year 2023/2024, with data collection methods of observation, questionnaires, interviews and tests. Qualitative descriptive techniques and descriptive statistics were used to analyze the data. The limited group trial showed a validity of 78.13%, the broad group trial showed a validity of 87.1%, and the material validation showed 88.75%. Student learning outcomes showed a higher average student post-test score of 81.75 compared to the pre-test score of 69.5. The results showed that Flip Book is a valid and effective learning tool and is suitable for use as an innovative learning media.

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INTRODUCTION

The development of health education, innovative, interactive and science literacy-based learning media is an urgent need. Science literacy, as explained by (Yuliati, 2017) includes the ability to link science understanding with real problem solving, especially in health issues. A science literacy-based approach not only improves students' understanding, but also helps them develop critical thinking skills and problem-solving abilities relevant to the real world. One promising learning media is the digital Flip Book.

This media combines text, images, video and sound in an interactive format, thus creating a more interesting and meaningful learning experience. The digital Flip Book developed in this study uses Flip PDF Professional software. This application is able to convert pdf files into digital form with visual effects such as turning book pages in real time. In addition, this product can be accessed in various formats such as exe, .html, and email, which makes it easier for users, including lecturers, students, and the general public. The advantage of Flip Book lies in its flexibility in inserting various multimedia elements that are

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relevant to learning needs. With an attractive design, this media is expected to increase student learning motivation and help them achieve the expected competencies.

The literature review shows that various learning media have been developed to support online learning, but it is still rare to specifically integrate science literacy approaches into interactive digital media. Simatupang et al. (2020) emphasized the importance of developing technology-based learning media that suits the needs of online learning, while (Himmah, 2019) showed the effectiveness of Flip Book in increasing student engagement in the learning process. However, previous studies have not explicitly linked the use of Flip Book with science literacy, especially in the context of health education. Therefore, this study fills the gap by developing a science literacy-based Flip Book specifically designed for health students.

The objectives of this study are: 1) Developing science literacy-based Adolescent Reproductive Health Flip Book media for ITS PKU Muhammadiyah Surakarta health students; 2) Knowing the feasibility of science literacy-based Adolescent Reproductive Health Flip Book media for ITS PKU Muhammadiyah Surakarta health students. This research is expected to provide scientific contributions in the form of innovative learning media that support the development of science literacy of health students. This media is also expected to be widely used in various health education institutions and become a reference in the development of other interactive digital learning media.

METHODS

This research uses the type of development research (Research and Development) with the Borg and Gall Model development procedure. This procedure consists of 10 stages of development which aims to develop science literacy-based Adolescent Reproductive Health Flip Book media for ITS PKU Muhammadiyah Surakarta Health students.

This research was conducted at the Faculty of Health Sciences ITS PKU Muhammadiyah Surakarta, odd semester of the 2022/2023 academic year. The research stages include design, development, validation, testing, and refinement of science literacy-based Adolescent Reproductive Health Flip Book media products.

The research sample was taken with Nonprobability Sampling - Purposive Sampling technique. Sugiyono (2016) states that nonprobability sampling is a sampling technique that does not provide equal opportunities for each member of the population. Furthermore, it is explained that in purposive sampling, the determination of the sample is carried out on certain considerations. In this study, this consideration is based on sources taken from those who are considered to know or understand the situation under study.

The data sources used are primary data sources and secondary data sources. Primary data sources were obtained directly from interviews, questionnaires, and questionnaires. Subjects include students as objects of observation, lecturers as interview sources, and material, media, and language experts as validators. While secondary data sources include documents and data from the archives of the ITS PKU Muhammadiyah Surakarta campus, research journals, and other supporting documentation.

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The data collection techniques used were: 1) Documentation which includes references from journals, theses, books, and other relevant sources, documentation of interview results, and product images or illustrations; 2) Observation, carried out in the online lecture process to understand the use of technology and identify the responses of lecturers and students to the Flip Book media developed; 3) In-depth interviews, conducted to understand the needs and problems faced in learning, as well as to gather input from sources related to media development; 4) Questionnaires and questionnaires, used to assess the feasibility of products from the perspective of media experts, material experts, linguists, and lecturers. Validation is carried out in several stages until the product is considered suitable for use.

Data were analyzed descriptively qualitative and descriptive statistics. Data from interviews, observations, and questionnaires were calculated in percentage to determine product validity. The results of the analysis were used to revise and improve the product before implementation.

RESULTS AND DISCUSSION

Flip Book Design

Figure 1. Flip Book Cover Design

The results and discussion can display data in the form of tables and images. Results must be supported by related references or can be compared with previous research. The results and discussion can display data in the form of tables and images. Results must be supported by related references or can be compared with previous research.

Results of Validation by Material Experts

a. Material Expert: Validation by material experts shows a validity level of 88.75%, with an average validity of aspects of learning objectives (95%), presentation of material content (84.37%), effectiveness of teaching materials (90%), and language (87.5%).
b. Media Expert: Validation by media experts showed an average validity level of 81.25%. The presentation technique aspect received a score of 87.5%, while the graphic aspect, including the design of teaching materials, colors, and illustrations, received a score of 84.37.

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Test Results

Table 1. Limited Test Results

No	Aspect	TSEV	S-max	V (%)
1	Flip Book suitability with course competency standards	3	4	75,00
2	Accuracy of learning objectives	3	4	75,00
3	Suitability of content	3	4	75,00
4	Providing motivation to students	3	4	75,00
5	The language used is appropriate	3	4	75,00
6	Type and size of letters used	3	4	75,00
7	Images used in Flip Book	4	4	100
8	Evaluation used	3	4	75,00
	Total			
	Percentage	25	32	78,125

Table 2. Broad Trial Results

No	Aspect	TSEV	S-max	V (%)
1.	How do you think the learning to write stories contained in the Flip Book?	264	304	85,86
2.	Can Flip Book make it easier to learn?	276	304	88,49
3.	Can Flip Book increase your enthusiasm for learning? you?	267	304	86,84
4.	Can Flip Book help you be more active in learning?	258	304	83,88
5.	Is the language used in Flip Book easy for you to understand?	261	304	84,87
6.	Is the type and size of the font in the Flip Book easy to read?	267	304	86,84
7.	Are the images used interesting?	259	304	84,54
8.	Do you easily understand Flip Book?	275	304	89,14
9.	How easy is it to do assignments based on Flip Book?	258	304	83,88
10.	Is this Flip Book useful in learning?	263	304	85,86
Total		2615	3040	
Average				87,1

Test Results

The results of the test were conducted on undergraduate nursing students, DIV Nursing Anesthesiology Class A and DIV Nursing Anesthesiology Class B, each using a sample of 20 students, are listed in tables 3, 4, and 5 below:

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Table 3. Test Results of S1 Nursing Study Program

No.	Name	Pre-tes	Post-tes
1	PY	70	85
2.	DP	65	85
3.	EW	80	75
4.	OP	80	75
5.	RS	75	75
6.	MS	75	85
7.	SC	70	85
8.	NF	60	75
9.	NS	60	80
10.	EY	70	85
11.	AF	70	85
12.	MW	75	85
13.	KR	65	85
14.	DS	65	85
15.	EA	65	80
16.	NF	70	85
17.	HN	55	80
18.	SR	75	75
19.	DE	75	85
20.	UA	70	85
Jumlah		1390	1635
Rata-rata		69,5	81,75

Table 4. Test Results of DIV Nursing Anesthesiology Program Class A

No.	Name	Pre-tes	Post-tes
1.	RF	65	90
2.	AW	70	85
3.	AR	70	85
4.	AP	60	75
5.	AD	75	75
6.	AN	65	85
7.	AA	60	80
8.	DV	60	80
9.	DW	60	80
10.	DA	65	90
11.	DF	75	80
12.	VA	80	90
13.	FF	80	75
14.	FA	65	80
15.	DP	60	80

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16.	HZ	75	75
17.	HW	80	80
18.	LL	80	75
19.	NN	70	85
20.	GM	70	85
Total		1245	1645
Average		69,25	82,25

Table 5. Test Results of DIV Nursing Anesthesiology Program Class B

No.	Name	Pre-tes	Post-tes
1	AA	70	90
2.	NF	80	75
3.	MA	55	90
4.	SP	80	75
5.	ZS	70	75
7.	AI	70	90
8.	DA	75	80
9.	EP	75	90
10.	IR	75	85
11.	IK	70	80
12.	KM	60	80
13.	AP	60	75
14.	AF	65	85
15.	KT	70	80
16.	SR	60	75
17.	SU	60	75
18.	PA	60	75
19.	NA	70	75
20	DA	70	85
Total		1370	1620
Average		68,5	81

Discussion

Design Analysis of the Development of Scientific Literacy-Based Adolescent Reproductive Health Flip Book

The Scientific Literacy-Based Adolescent Reproductive Health Flip Book developed is an ebook that has an A5 size. The “Adolescent Reproductive Health” Flip Book is designed with science literacy to increase adolescent girls' understanding of reproductive health. This book not only provides basic knowledge about reproductive health, but also discusses the concept of scientific literacy to help them think critically and understand more about the problem.

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Specifically, this flip book presents various topics on adolescent reproduction and health. These include information on the physical and emotional changes that occur during puberty, as well as problems that adolescents may face, such as dysmenorrhea, STDs, reproductive tract infections, and anemia. In addition, the delivery of materials is intended to provide reproductive health information and protection rights in accordance with various health guidelines and regulations.

The scientific literacy-based approach applied in this flip book focuses on presenting data and facts supported by the latest research. Through evidence-based information, adolescents are encouraged to evaluate, analyze, and make informed decisions regarding their health. The design also emphasizes the importance of gender equality and reproductive rights, which include the right to clear information, adequate services, and freedom from discrimination.

This flip book design not only contains text, but also images, videos, and sound to create a more interactive learning experience. This flip book uses Flip PDF Professional software that can convert *pdf files into digital form with a reversible page effect, increasing attractiveness and user engagement. The scientific literacy-based approach helps students to think critically by presenting evidence-based data and encouraging proper evaluation and decision-making related to reproductive health. This flip book also emphasizes gender equality and reproductive rights, providing clear access to information free from discrimination.

The results showed that this flip book is effective in improving students' understanding of reproductive health, with validation from material experts and media experts showing a high level of feasibility. Student trials showed a significant increase in learning outcomes, indicating that this media is able to increase learning motivation and student engagement in learning.

Analysis of the Feasibility Level of Scientific Literacy-Based Adolescent Reproductive Health Flip Book

The feasibility level of the Scientific Literacy-Based Adolescent Reproductive Health Flip Book can be analyzed completely based on various aspects, such as the results of material expert validation, aspects of presentation of material content, effectiveness of teaching material functions, language aspects, media expert validation results, and field trial results.

a. Material Expert Validation Data Analysis

Based on the results of the material expert validation, this flip book gets very good results in terms of learning objectives, presentation of content, effectiveness of teaching material functions, and language. In the aspect of learning objectives, this flip book is considered in accordance with the achievement of learning objectives, with an average validity of 95%. The material expert validation assessed that the learning objectives included were explicit and easily understood by students, although there were several parts that needed revision to clarify the relationship between reproductive health material and adolescents' daily lives.

In the aspect of presenting the content of the material, the flip book gets a score of 84.37%. The material is presented with accuracy and breadth in accordance with the learning outcomes and characteristics of students. However, revisions were made to several sections,

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such as a more in-depth explanation of dysmenorrhea and the difference between primary and secondary dysmenorrhea, as well as the addition of clearer evaluation instructions.

The aspect of the effectiveness of the function of teaching materials is also considered very good, with an average validity of 90%. This flip book is considered to facilitate student understanding of the material and evaluation tools, and is able to stimulate students to think critically and actively in learning.

In the language aspect, the choice of words and language used has been assessed in accordance with the characteristics of students, with a value of 87.5%. The language used is considered easy to understand, although some medical terms need additional explanation to facilitate student understanding, such as the terms “endometriosis” and “amenorrhea”.

b. Media Expert Validation Data Analysis

Media expert validation also showed very good results, especially in the aspects of presentation techniques and graphics. In the presentation technique aspect, the flip book received a score of 87.5%, where the concept and systematic presentation of the material were considered coherent and consistent. The graphical aspect, which includes the design of teaching materials, typography, illustrations, and colors, also received a high score with an average of 87.5%. The flip book design is considered harmonious with the use of attractive and appropriate colors, as well as images and illustrations that support the explanation of the material. Some suggestions for improvement were given, such as more interesting color variations on the cover and display adjustments to make it more attractive to students.

Analysis of Field Trial Data

The results of the field trial were conducted in two groups, namely limited group trials and broad groups, with the results showing that this flip book is very feasible and effective to use as learning media. In the limited group trial involving Midwifery Study Program students at ITS PKU Muhammadiyah Surakarta, the data showed that this flip book was able to provide high learning motivation, facilitate students in understanding the material, and help them become more active in learning. The average validity of the assessment of the aspects of content suitability, learning objectives, and images used reached 78.13%.

In the wide group trial, this flip book was tested on students of S1 Nursing and DIV Nursing Anesthesiology Study Program. The results of this trial showed a significant increase in student learning outcomes. The average validity of the aspects of ease of learning, language, font, and images used reached 87.1%. The students also reported that this flip book helped them understand the material better, increased their enthusiasm for learning, and made it easier to do assignments related to reproductive health material.

The pre-test and post-test results also showed a significant increase in student understanding after using the flip book. In the S1 Nursing Study Program, the average pre-test score of students was 69.5, while the post-test score increased to 81.75. The same results were seen in the DIV Nursing Anesthesiology Study Program, where the average pre-test score was 69.25 and the post-test score increased to 82.25.

Overall, based on the results of the field trial, this flip book proved effective in increasing students' understanding of adolescent reproductive health, increasing learning motivation, and making the learning process more interactive and meaningful. The feasibility level of this

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flip book is good with some revisions proposed by experts to further refine this learning media.

CONCLUSION

Based on the results and discussion above, the conclusions of this study are as follows: This flip book was successfully developed to help students understand the concept of adolescent reproductive health through an interactive science literacy approach. Feasibility of Scientific Literacy-Based Adolescent Reproductive Health Flip Book Media. Based on the material expert validation, this flip book gets an average validity of 88.75%. The aspect of learning objectives scored 95%, presentation of material content 84.37%, effectiveness of teaching materials 90%, and language 87.5%. Some minor revisions were made to improve the explanation related to dysmenorrhea and evaluation instructions, which improved the quality of the material. In the media expert validation, the flip book obtained an average validity of 81.25%. Aspects of presentation techniques and completeness of teaching materials scored 87.5%, while graphic aspects such as teaching material design, typography, and color scored 84.37%. Media experts provide suggestions for improving color variations and visual displays to make them more attractive. Field trials showed that this flip book was considered very helpful for students in understanding the material and motivating them to learn. In the limited group trial, the validity value of the aspects of content suitability, learning objectives, and the images used reached 78.13%. Meanwhile, in the broad group, the validity of the aspects of ease of learning, language, and visual appearance reached an average of 87.1%. This flip book proved effective in improving students' understanding of adolescent reproductive health, as evidenced by the increase in post-test scores compared to the pre-test in the field trial. The flip book is also considered capable of increasing student motivation and active participation in the learning process.

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