



Flipbook Learning Source (FLS) Based on Socio Science Issues (SSI): Effectiveness for Increasing Junior High School Students' Science Literacy

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ABSTRACT

In the development of information technology, knowledge about natural sciences is increasingly easy to obtain. Scientific literacy skills are part of the 21st century skills that students must have so that they can adapt to complex problems that may occur in their surrounding environment. Electronic textbooks that can encourage students to practice using scientific literacy skills that can be used to identify and analyze scientific problems around students until they can be solved. Flipbook Learning Source (FLS) based on Socio Science Issues (SSI) is an electronic textbook that is interpreted as a social issue with a scientific context that connects students with scientific discussions developing in society to be explored. The aim of this research is to examine the effectiveness of SSI-based FLS for increasing junior high school students' scientific literacy. Development research stages based on 4-D development research design. This research was carried out at junior high schools in the Besuki Ex-Karisidenan. Time for conducting research in Odd Semester 2022/2023. The results of the N-Gain Score test was carried out to determine the increase in students' scientific literacy, the average increase was 0.48 in the medium category. Scientific literacy abilities can be demonstrated from students' ability to use scientific knowledge, identify questions and be able to draw conclusions based on facts that occur in the natural environment and be able to make decisions in the process of change. Scientific literacy skills enable students to analyze scientific problems that exist in everyday life.

Keywords: Effectiveness, Flipbook Learning Source, Literacy Science, Socio Scientific Issues.

INTRODUCTION

The challenges of scientific and technological progress require students to have skills in the 21st Century that will be used to compete with the era of globalization and the rapid acceleration of the development of information flows. Scientific literacy skills are part of the 21st century skills that students must have so that they can adapt to complex problems that may occur in their surrounding environment. The results of research on scientific literacy skills for students from several junior high schools in Indonesia still do not show good results. The results of research on students' scientific literacy abilities show scores that are still in the low category [1][2][3]. On average, the low level of scientific literacy ability is due to a lack of opportunities/facilitation that can accommodate scientific literacy activities during learning. On average, the cause of low scientific literacy is that the science learning process carried out has not facilitated students to use scientific literacy skills. Electronic textbooks that can encourage students to practice using scientific literacy skills that can be used to identify and analyze scientific problems around students until they can be solved. Flipbook Learning Source (FLS) based on Socio Science Issues (SSI) is an electronic textbook that is interpreted as a social problem with a scientific context that connects students with scientific discussions developing in society to be explored [4]. These social scientific problems will make students gain experience about what they are learning so that learning becomes more meaningful [5]. Social Scientific Issues are closely related to social scientific problems such as cloning, biotechnology, global warming, climate change, environmental contamination, alternative energy sources, genetically modified food [6][7].

Science learning is aimed at giving students the opportunity to cultivate natural curiosity and develop the ability to ask questions and find answers to natural phenomena based on evidence. The results of the research team based on road maps from 2018 to 2022 provide further relevant action plans including: (1) learning tends to be teacher-centred; this results in learning not actively involving students through scientific activities; (2) the lack of learning resources in the form of textbooks for students to understand science concepts; and (3) the use of ICT for easy access to textbooks has not yet been implemented. It is possible that junior high school science textbooks will train students to explore themselves and find solutions to problems that develop in society. So that students' scientific literacy skills become increasingly sharpened and trained when learning to use this e-book [8]. The aim of this research is to examine the effectiveness of SSI-based FLS for increasing junior high school students' scientific literacy. The suitability of textbooks according to [10] is shown from the values of validity, practicality and effectiveness. Achieving quality implementation of the Tridharma with the output of scholarly graduates who, among other things, produce intellectual work and excellent products for the progress and independence of the Indonesian nation [11].

LITERATURE REVIEW

Science Learning

The Nature of Science Natural knowledge is the underlying characteristic of science science. The essence of science is a scientific stage starting from attitudes, processes, products and can give rise to technology [12]. Apart from that, natural science is also closely related to observations and research regarding symptoms that occur in the natural environment [13].

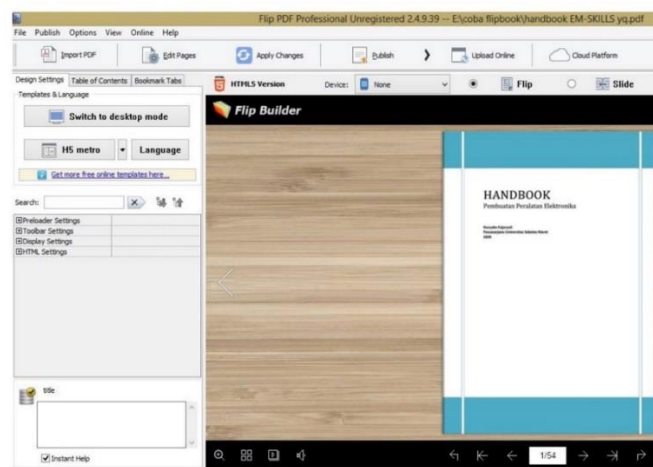
Therefore, to investigate the symptoms that occur in nature by carrying out science learning activities. Science learning is directed at finding out about events that occur in nature in order to foster students' scientific attitudes. This century's learning leads to critical thinking, problem solving, social emotional skills to face the challenges of the industrial revolution 4.0 [12][13]. This development creates problems in the form of global problems, environmental pollution and the energy crisis. This is caused by a lack of understanding of natural sciences [14]. The science learning process tends to involve memorization and lack of skill in using the knowledge so that it does not hone the ability and potential to think [15][16]. This can be seen from the low ability of students to analyze and apply the concept of these problems, so that it has an impact on scientific literacy skills and the ability to solve problems that occur around them.

Socio Scientific Issues (SSI)

Natural Sciences (IPA) relate to whatever events occur in nature in everyday life. Socio Scientific Issues (SSI) is a science learning process that is linked to social issues in the community environment and supports the potential for intellectual development, scientific attitudes, communication skills and intellectual development [14]. Learning based on social scientific issues is a means of connecting scientific arguments related to real evidence obtained and the issue being resolved [15]. Based on several opinions, it is stated that SSI is very good if integrated into science learning because social science issues will be resolved using science concepts and theories. Therefore, in science learning to integrate SSI using learning media.

Flipbook Learning Source (FLS) Based on Socio Science Issues (SSI)

Textbooks are important learning media in all subjects at school. Textbooks are learning tools created to achieve learning goals and contain material that is in accordance with the curriculum and syllabus [16]. Therefore, in science learning, textbooks are needed that can improve students' scientific attitudes to resolve scientific issues in society and students' scientific attitudes can develop. Developing textbooks, namely electronic books (e-books), one of which is a flipbook using <https://www.flipbuilder.com/> which is shown in Figure 1. Flipbook is a type of e-book that has unique features, diverse content, can load files in the form of moving images, video and sound and has the advantage of the illusion of flipping the book like a normal textbook [17][18][19]. SSI-based FSL will enable students to link social science issues in society with concepts and theories in science learning.



Gambar 1: SSI-based FSL Development Process

Scientific Literacy

In this era of increasingly rapid learning, students increasingly lack good scientific literacy. Scientific literacy is the use of scientific knowledge, identifying questions to being able to draw conclusions based on facts that occur in the natural environment and being able to make decisions in the process of change [19].

Apart from that, scientific literacy in the current learning era is important because by having scientific literacy, students will be able to respond to scientific issues in the social environment [20]. However, the scientific literacy abilities of students in several SMP/M.Ts. still does not show a good category (still low) [1][2][3]. Therefore, there needs to be media that can be used to develop scientific literacy skills. Textbooks that are integrated with the SS approach can increase high school physics science literacy among students in the high category [21][9].

RESEARCH METHODS

Research Type and Design

This type of research is Research and Development (R & D) [22]. The development research stages are based on the 4-D development research design [23].

Research Subject, Place and Time

The subjects in this research included class VIII students who studied additives and addictive substances. This research was carried out at junior high schools in the Besuki Ex-Karisidenan, namely Banyuwangi, Jember, Situbondo, and Bondowoso. Time for conducting research in Odd Semester 2022/2023.

Research Stages

The stages used in this research are as follows: define, design, develop, and disseminate which are described as follows.

- a. At the define stage, it is used to determine learning needs which include beginning-to-end analysis, student analysis, task analysis, concept analysis, and analysis of learning objective specifications.
- b. At the design stage, tests are carried out, media selection, format selection, initial design of SSI-based FLS.
- c. At the develop stage, product validation is carried out including expert validation which will be carried out by education experts, and validation by users, in limited trials and class trials using a one group pretest-posttest design.
- d. The final stage, namely dissemination, is carried out in other classes, other schools or by other teachers.

Data Analysis Technique

The effectiveness of using scientific literacy tests based on each indicator and documentation during research activities. The effectiveness of SSI-based FLS can be seen from students' scientific literacy scores calculated for each indicator. Analysis of the effectiveness of SSI-based FLS can be analyzed using the following formula:

$$NP = R / SM \times 100\%$$

Description:

NP = Literacy ability value

R = Total score of questions answered correctly
 SM = Maximum score from the test

Table 1: Scientific Literacy Score Criteria

Skor	Criteria
86-100	Very Good
72 – 85	Good
58 – 71	Enough
43 – 57	Low
≤ 43	very low

[23]

Quantitative data was carried out with one group pre-test post-test using N-gain analysis as follows:

$$N - gain = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

Description:

N-gain = Normalized Gain Value

S_{post} = Post-test value

S_{pre} = Pre-test value

S_{max} = Maximum Value

Table 2: Criteria N-gain

Skor	Criteria N-gain
0,70 < N-gain	High
0,30 ≤ N-gain ≤ 0,70	Currently
N-gain < 0,30	Low

RESULT AND DISSCUSION

Seven indicators are used to determine students' abilities in scientific literacy to determine scientific literacy abilities. These seven indicators refer to indicators of scientific literacy abilities from Gormally et al. (2012).

The seven measurements of scientific literacy indicators are

1. identifying valid scientific opinions
2. conducting effective literature searches
3. understanding the elements of research design and how they impact findings/conclusions (4) creating appropriate graphs from the data;
4. solve problems using quantitative skills, including basic statistics;
5. understand and interpret basic statistics;
6. make inferences, predictions and draw conclusions based on quantitative data.

Indicators of scientific literacy abilities) was chosen because it is very simple, easy to implement and reflects scientific literacy abilities. Apart from that, these three indicators are contained in three scientific competencies which are measured in scientific literacy. Identifying

scientific issues (problems) is in indicator 1, explaining scientific phenomena is in indicators 2 to 6, and using scientific evidence is in indicator 7.

Table 3: Results of Scientific Literacy Scores

No	Scientific Literacy Indicators	Score		N-gain	Criteria
		Pre-test	Post-test		
1	Identify valid scientific opinions	62%	95%	0,84	high
2	Conduct an effective literature search	52%	75%	0,45	Currently
3	Understand impact	62%	86%	0,63	Currently
4	Create precise graphs from data	35%	61%	0,41	Currently
5	Solve problems using quantitative skills	54%	71%	0,39	Currently
6	Interpretation	42%	51%	0,15	Low
7	Drawing conclusions	54%	71%	0,39	Currently
Avarage		51%	73%	0,48	Currently

Based on Table 3, the N-Gain Score test was carried out to determine the increase in students' scientific literacy, the average increase was 0.48 in the medium category. With SSI, science learning will be easier to do because it directly connects science events in the community. This is supported by research results [8] showing that e-books can increase students' scientific literacy in the high category. Next, research results [9][24] show that problem-based learning with SSI has an effect on increasing scientific literacy and problem-solving abilities. Therefore, the integration of SSI into textbooks can enable students to better understand natural phenomena which are social science issues. Apart from that, if SSI is integrated into a flipbook, it will be able to provide content that is relevant to problems that occur in everyday life related to science [25][26]. In this way, this SSI-based flipbook can make students' scientific literacy develop.

The low level of scientific literacy of students in Indonesia based on PISA results from year to year is one of the problems of education in Indonesia. Low scientific literacy causes a lack of students' ability to develop and improve creative abilities in using science in everyday life, difficulty in solving problems, and slowness in determining and making decisions [27] [29]. Another impact of low scientific literacy is that students are less responsive to problems and developments related to the surrounding environment, such as natural phenomena and local regional characteristics. Based on these impacts, it is necessary to analyze the low scientific literacy abilities of students in Indonesia based on PISA results and various causal factors, so that we can find out what aspects need to be updated and improved in learning in accordance with the demands of current developments [28]. Parents and the community have a crucial role in students' scientific literacy abilities. When they are no longer at school, parents can provide educational activities through fun things such as going for a walk observing natural phenomena in the surrounding environment [30]. Society as a large community that is interdependent or dependent on each other can provide innovations such as persuasive movements to increase scientific literacy, such as opening reading corners, campaigning for the importance of scientific literacy and its relevance to real events in everyday life (contextual). Thus, science learning must be able to contain natural concepts related to science in order to enable students to reach the stage of being scientifically correct. 21st century learning has placed the industrial world at

the forefront with the very rapid development of scientific and technological progress to meet human needs [31].

CONCLUSION

The effectiveness of increasing students' scientific literacy is very important, especially for junior high school students. Scientific literacy is important because it has the aim of creating ideas or ideas that are effective and critical in looking at problems and solving problems, of course with creative ideas. Flipbook Learning Source (FLS) based on Socio Science Issues (SSI) is an electronic textbook that is interpreted as a social problem with a scientific context that connects students with scientific problems developing in society to be explored. E-books can increase students' scientific literacy in the high category. The results of the N-Gain Score test was carried out to determine the increase in students' scientific literacy, the average increase was 0.48 in the medium category. Next, the research results show that problem-based learning with SSI has an effect on increasing scientific literacy and problem-solving abilities. Therefore, the integration of SSI into textbooks can enable students to better understand natural phenomena which are social science issues. Apart from that, if SSI is integrated into a flipbook, it will be able to provide content that is relevant to problems that occur in everyday life related to science. In this way, this SSI-based flipbook can make students' scientific literacy develop. In this way, this SSI-based flipbook can make students' scientific literacy develop.

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