

Development of Flipbook using Web Learning to Improve Logical Thinking Ability in Logic Gate

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Abstract—The multimedia-based learning process has great potential to change the way of learning. One of them is a growing multimedia Flipbook from textbooks, with ease of reading and learning without carrying a thick book. The purpose of this study is to produce a Flipbook-assisted Web Learning development product and to improve the ability to logical thinking by using those products. This type of research using the 4D Models model consisting of define, design, develop, and disseminate. The results of the development with expert data validation analysis obtained an overall percentage of 83.92% included in the excellent category. Analysis of the validation of media expert's overall percentage obtained 80% included in the excellent category. And the validation analysis of peers the overall percentage found 84.78% included in the excellent category. From all analysis shows that flipbook-assisted teaching materials web learning is appropriate to be used. The results of the t-test calculations show 10.25 higher than 2.045, the use of flipbook logic gates assisted with web learning increases the ability of logical thinking. And the analysis of N-Gain 0.39 in including the medium criteria, the flipbook gate logic assisted with web learning to increase the ability to logical thinking.

Keywords—Multimedia based learning; flipbook; web learning; logical thinking; logic gates

I. INTRODUCTION

The development of information and communication technology is a concern in all countries. The internet has penetrated the community, even education is outdated if it is not integrated with the internet. The Indonesian government supports through the Minister of Education and Culture Regulation No. 24 of 2012 which is about distance education (PJJ) organized by tertiary education. And approved by Law No. 12 of 2012 concerning higher education specifically in article 31 paragraph 2, approving the implementation of distance education to collect and examine arrangements in education and learning in Higher Education. This shows the importance of online-based learning in discussion and learning in higher education. With online-based learning, students can plan learning time and complete material better.

The multimedia-based learning process has great potential to change the way of learning. Multimedia modules or textbooks become a guide in learning, in accordance with the research of Abu Bakar et al the modules which have visual and graphic elements are very suitable in learning and have the feasibility to be used [1]. One of them is Flipbook, multimedia that developed from textbooks with ease of reading and

learning without carrying thick books. In Sugianto's research [2] the virtual module based on Flipbook has an impact on improving learning outcomes, especially in learning digital basics. Arai's research also mentioned that e-learning is capable and effective in learning, especially learning complex formulas [3]. This shows that the use of media is important in learning based on some of this research.

Logic gate becomes material that must be understood by informatics engineering students. Where ordinary algebraic understanding cannot be applied in logic gate material. It takes time and understanding to be accepted by logic. According to Halim [4], the basic material for logic gates is needed by media which helps to facilitate further understanding. As in the study of Ash-Shiddieqy et al stated that the right media can provide effectiveness in improving logical thinking [5]. according to the research, G. Deena and D. K. Raja also state that it takes media such as E-learning because it is a very flexible time and space in learning [6].

From the observation of informatics engineering students at the University of Peradaban 6th semester of the academic year 2017/2018 who have taken digital courses. Students who understand logic gate material is not more than 50% and the difficulty faced is the lack of learning meeting time and teaching materials that still cannot be understood without teaching. This refers to the need for effective learning outside the classroom that is able to provide understanding and time that adjusts from the support of the Indonesian government through the rule of law regarding multimedia and internet-based learning. Refer also from previous research regarding the importance of technology-based learning, both in terms of multimedia and internet-based learning. Reinforced by the results of observations resulted that some students did not understand the logic gate material. This shows that it is needed learning media that are able to provide a flexible alternative in learning that is by developing Flipbook Learning aided Web Learning on logic gate materials to improve the ability of logical thinking.

The limitation of the research is the material that focuses on logic gates because it is related to students' ability to think logically. Another disadvantage is that flipbooks require a computer, smartphone, and internet connection to use. If there is none, then learning/lecture is difficult. Then this study aims only to find out the increase in the use of logic gate material flipbooks to improve logical thinking skills.

II. LITERATURE REVIEW

A. E-Learning

Technological development is a benchmark for change in everything. Industry, society, and even education take part in the effects of technological development. Technology is very influential, one of which is learning media; Indonesian government through Government Regulation No. The year 2005 contains in the organization of education units must be held interactively, inspiring, fun, creative, motivating students, initiatives, channeling talents, interests, supported by physical as well as students who are processed in learning. The explanation provides the view that innovation in developing textbooks is a necessity to support learning.

Electronic Learning (E-Learning) is no longer a common thing in learning innovation under technological developments. There are many types of e-learning that can be used, one of them is E-Book. According to the research Salem et al, e-learning proved beneficial, in that students can gain knowledge or information with a low cost of education and students can learn in all times and places [7]. According to Korat et al that the eBook has the advantage of software-based multimedia that can be used in a proper electronic device [8]. Making E-Books in technological developments now many applications that can be used such as Microsoft Office, Macromedia Flash, Adobe Reader PDF, and Flipbook Maker. Flipbook Maker: The application can be used to make the E-Book look more attractive, simple and easy to use.

Flipbook Maker is a textbook application in the form of files to make it more interesting. According to Hidayatullah Flipbook Maker helps students read directly to feel like opening a book with interesting animation effects [9]. Mulyadi & Wahyuni also stated that the use of Flipbook in the medium of learning to improve students' creative thinking [10]. Also supported by Biological research is the use of Flipbook learning media that can also improve student learning outcomes in physics [11]. So learning integrated with technology through Flipbook provides benefits for students in the learning process.

B. Logical Thinking

Scientific thinking in learning in higher education becomes a necessity in terms of knowledge and skills in order to be growing. Logical thinking is one of the scientific thoughts that must be possessed. Logical thinking cannot be separated from reality, where thinking is the result of the product of reality in the form of the laws of reality which become rules of thinking [12]. For example, in thinking someone adding up the numbers 1 and 1 will produce the number 2, then this is supported by the reality and reality of the facts that can be proven. Heryadi states etymologically logic is a science of reasoning or reasoning that makes the law of thought acceptable [13]. So it can be concluded logical thinking rules of thought that can be accepted by reason and proven by facts.

According to Suryabrata, Logical thinking, in essence, goes through three stages [14]. First the construction of understanding, human thought is based on understanding a concept and then building the main contents in thinking. Second, opinion construction arises where the understanding

that has been formed is supported by connecting the existing theoretical concepts and observing objects or events so that it becomes a logical process. And lastly, a Construction conclusion is drawn from an opinion that evaluated the existing concept of knowledge into new knowledge. This process is taken into consideration or decision making to be the correct reasoning process.

Logical thinking is very useful in achieving the learning objectives that have been made. As in Yani et al., all research [15] developments in logical thinking play a role in the achievement of learning objectives, especially in science experiments. Even in research Fadiana et al used a logical thinking ability test to find out the students' initial ability to make learning plans [16]. Supported by Othman et al [17] that logical thinking can be used to analyze the way of learning of students who have low cognitive levels combined with students who think high cognitive.. Some of these studies show the importance of increasing students to improve the ability to logical thinking in their application.

III. METHOD

A. Research Methods

This research was conducted to create learning media with a flipbook. Then validated by material experts, media experts, and peer reviews. The product developed in the form of a flipbook was then tested on Peradaban University students to find an increase in logical thinking skills. To develop a product used by the 4D model development research. Where the 4D Model process consists of define, design, develop, and disseminate.

B. Define

This stage of the process is carried out planning needs in developing products. With the stages of the study of literature from several reference theories in accordance with product development. Field studies are observing students about the difficulties encountered in lectures.

C. Design

This stage goes through several processes consisting of:

- Looking for material reference: The determination of references for the material is needed to provide guidelines or references in the basic theory and context of the product to be developed.
- Preparation of teaching material: This process is carried out in the preparation of the contents of the development product based on several references.
- Preparation of electronic-based textbooks: This process is an advanced stage in the form of a rough form of electronic textbooks, determining the teaching material to be developed is able to provide an interest
- Design: This process emerges the initial product design which will be carried out to the development stage and validated

D. Development

The development phase is carried out in several stages, namely as follows:

- Development Stage: the draft that has been made then drafted the book product in a format suitable for the device to be used in the form. Flipbooks compiled in the making of designs are made to suit the use of Web Learning. The contents of the material are arranged to develop logical thinking skills.
- Expert Validation Stage: the aim of expert validation is to produce revised product drafts based on expert input. After the draft-1 is validated, the next step is to revise draft-1 so that it produces draft-2.
- Small-scale Trial: draft-2 revised draft-1 then a small-scale trial is conducted. For small scale trials that can be done with a Forum Group Discussion (FGD). This trial was conducted to obtain input and suggestions for improvement as well as assessment. The results of this small-scale trial will be used to revise the initial product to produce draft-3.
- Field Trials: draft-3 is then conducted field trials or large-scale trials, the purpose of this stage is to test the feasibility of the product.

E. Disseminate

This stage is the stage of using Web Learning-assisted Flipbook on logic gate material to measure the increase in logical thinking skills.

F. Population and Research Sample

The population for the selection is 6th-semester students (even) with a total of 30 students or one class. The sampling technique used is "saturated sample" meaning that the entire population that has been determined is used as a research sample. This is because the total population of 6th-semester students is relatively smaller.

G. Product Validity Analysis

The method of collecting product validity data uses a questionnaire, containing statements addressed to material experts, media experts, and peer reviews. Analysis of product data using a Likert scale questionnaire with a score of 1 to 4, with the rating category (4) very good, (3) good, (2) Poor, (1) very poor. Material experts observe and validate products on the aspect of content, aspects of material accuracy, stimulate curiosity, presentation and use of web learning on a flipbook. Media experts have validated the aspects of presentation, general appearance, language and readability, and the use of web learning on a flipbook. For peer review covering all aspects because they are practitioners in teaching.

TABLE. I. QUANTITATIVE SCORE RANGE FOR EACH CATEGORY

No.	Quantitative Score Range	Category
1	$\bar{X} > (M + 1.5 Si)$	Very Good
2	$M < \bar{X} \leq (M + 1.5 Si)$	Good
3	$(M - 1.5 Si) < \bar{X} \leq M$	Poor
4	$\bar{X} \leq (M - 1.5 Si)$	Very Poor

The results of the validation questionnaire are then analyzed with a range of categories according to Table I.

For the value \bar{X} is the average of the scores for each category of validators. M is the median of each category score. then Si is the standard deviation of each score.

Analysis of the ideal percentage of flipbook products using web learning with equation 1.

$$Percentage (\%) = \frac{total\ validation\ score}{maximum\ score} \times 100\% \tag{1}$$

H. Analysis of Increased Logical Thinking Ability

The analysis compares the conditions before and after the field test so that the hypothesis is comparative using the t-test for two groups of data from one pair of sample groups as follows:

$$t = \frac{M_d}{\sqrt{\frac{\sum X_d^2}{n(n-1)}}} \tag{2}$$

Hypothesis for t-test from Eq. 1 for two data groups from one paired sample group namely:

H_0 = There is no difference in mean values

H_a = There is a difference in the mean value

Analysis to test the improvement of logical thinking skills is by:

$$gain = \frac{skor\ post\ tes - skor\ pretes}{skor\ maximum - skor\ pretes} \tag{3}$$

The gain criteria are as follows:

Height : $g \geq 0.7$

Medium : $0.7 > g \geq 0.3$

Low : $g < 0.3$

IV. DATA ANALYSIS

Data analysis performed is product validity and analysis of logical thinking improvement. Data validity analysis of experts using the and analysis of logical thinking improvement Microsoft Excel application, which has been set up for calculating the validity and conclusion of its category.

Analysis of the validity of the material experts from the overall score criteria is in Table II. An analysis of the recap of overall validity by media experts according to Table III then for the overall analysis of data from the peer review according to Table IV.

Validity analysis by material experts containing 14 assessment criteria aimed at practitioners of logic gate material. The questionnaire which contains 14 criteria has 2 aspects of content, 2 aspects of material accuracy, 3 aspects of stimulating curiosity, 2 aspects of presentation, and 5 aspects of the use of web learning. The analysis also shows that each of these aspects has a very good category can be seen in Table VI.

The media experts in accordance with Table III show that they have 18 validity assessment criteria, which refer to learning media practitioners. where each aspect is 5 aspects of

presentation, 5 aspects of general appearance, 3 aspects of language and readability, and 5 aspects of the use of web learning.

TABLE. II. ANALYSIS OF SCORE VALIDITY MATERIAL EXPERTS

Overall Validity Score																												
Total criteria	14	<table border="1"> <thead> <tr> <th>No</th> <th colspan="2">Range Score</th> <th>Category</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td>$X >$</td> <td>45.5</td> <td>Very Good</td> </tr> <tr> <td>2</td> <td>35</td> <td>$<X \leq$</td> <td>45.5</td> <td>Good</td> </tr> <tr> <td>3</td> <td>24.5</td> <td>$<X \leq$</td> <td>35</td> <td>Poor</td> </tr> <tr> <td>4</td> <td></td> <td>$X \leq$</td> <td>24.5</td> <td>Very Poor</td> </tr> </tbody> </table>	No	Range Score		Category	1		$X >$	45.5	Very Good	2	35	$<X \leq$	45.5	Good	3	24.5	$<X \leq$	35	Poor	4		$X \leq$	24.5	Very Poor		
No	Range Score		Category																									
1			$X >$	45.5	Very Good																							
2	35		$<X \leq$	45.5	Good																							
3	24.5		$<X \leq$	35	Poor																							
4		$X \leq$	24.5	Very Poor																								
Maximum score	56																											
Minimum score	14																											
M	35																											
Sb	7																											
Average Score (X)	47																											
Conclusion :																												
From the results of the analysis of the validation of the material experts, it was found that flipbook assisted by web learning was included in the category					Very Good																							

TABLE. III. ANALYSIS OF SCORE VALIDITY MEDIA EXPERT

Overall Validity Score																												
Total criteria	18	<table border="1"> <thead> <tr> <th>No</th> <th colspan="2">Range Score</th> <th>Category</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td>$X >$</td> <td>58.5</td> <td>Very Good</td> </tr> <tr> <td>2</td> <td>45</td> <td>$<X \leq$</td> <td>58.5</td> <td>Good</td> </tr> <tr> <td>3</td> <td>31.5</td> <td>$<X \leq$</td> <td>45</td> <td>Poor</td> </tr> <tr> <td>4</td> <td></td> <td>$X \leq$</td> <td>31.5</td> <td>Very Poor</td> </tr> </tbody> </table>	No	Range Score		Category	1		$X >$	58.5	Very Good	2	45	$<X \leq$	58.5	Good	3	31.5	$<X \leq$	45	Poor	4		$X \leq$	31.5	Very Poor		
No	Range Score		Category																									
1			$X >$	58.5	Very Good																							
2	45		$<X \leq$	58.5	Good																							
3	31.5		$<X \leq$	45	Poor																							
4		$X \leq$	31.5	Very Poor																								
Maximum score	72																											
Minimum score	18																											
M	45																											
Sb	9																											
Average Score (X)	62																											
Conclusion :																												
From the results of the analysis of the validation of the material experts, it was found that flipbook assisted by web learning was included in the category					Very Good																							

The validity criteria in the peer review questionnaire are more than the others. The total overall assessment criteria in the peer review were 23 criteria, consisting of 2 aspects of content, 2 aspects of material accuracy, 3 aspects of stimulating curiosity, 5 aspects of presentation, 5 aspects of general appearance, 1 aspect of language and readability, and 5 aspects of the use of web learning.

Data analysis increased logical thinking according to Table V. Data were taken through the pre-test before the treatment and post-test after the use of a flipbook assisted with web learning. Table V shows the analysis of the t-test and N gain from the pretest and posttest data.

TABLE. IV. ANALYSIS OF SCORE VALIDITY PEER REVIEWS

Overall Validity Score																												
Total criteria	23	<table border="1"> <thead> <tr> <th>No</th> <th colspan="2">Range Score</th> <th>Category</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td>$X >$</td> <td>74.75</td> <td>Very Good</td> </tr> <tr> <td>2</td> <td>57.5</td> <td>$<X \leq$</td> <td>74.75</td> <td>Good</td> </tr> <tr> <td>3</td> <td>40.3</td> <td>$<X \leq$</td> <td>57.5</td> <td>Poor</td> </tr> <tr> <td>4</td> <td></td> <td>$X \leq$</td> <td>40.25</td> <td>Very Poor</td> </tr> </tbody> </table>	No	Range Score		Category	1		$X >$	74.75	Very Good	2	57.5	$<X \leq$	74.75	Good	3	40.3	$<X \leq$	57.5	Poor	4		$X \leq$	40.25	Very Poor		
No	Range Score		Category																									
1			$X >$	74.75	Very Good																							
2	57.5		$<X \leq$	74.75	Good																							
3	40.3		$<X \leq$	57.5	Poor																							
4		$X \leq$	40.25	Very Poor																								
Maximum score	92																											
Minimum score	23																											
M	57.5																											
Sb	12																											
Average Score (X)	78																											
Conclusion :																												
From the results of the analysis of the validation of the material experts, it was found that flipbook assisted by web learning was included in the category					Very Good																							

TABLE. V. DATA ANALYSIS T-TEST AND N GAIN

SAMPL E	PRETE S	POSTE S	GAIN (d)	Xd	(Xd) ²	N GAIN
1	32	64	32	11.2	125	0.47059
2	44	64	20	-0.8	0.64	0.35714
3	64	65	1	-19.8	392	0.02778
4	64	76	12	-8.8	77.4	0.33333
5	52	76	24	3.2	10.2	0.5
6	48	75	27	6.2	38.4	0.51923
7	68	56	-12	-32.8	1076	-0.375
8	48	65	17	-3.8	14.4	0.32692
9	68	78	10	-10.8	117	0.3125
10	64	77	13	-7.8	60.8	0.36111
11	48	75	27	6.2	38.4	0.51923
12	36	56	20	-0.8	0.64	0.3125
13	52	67	15	-5.8	33.6	0.3125
14	68	80	12	-8.8	77.4	0.375
15	64	78	14	-6.8	46.2	0.38889
16	28	56	28	7.2	51.8	0.38889
17	56	76	20	-0.8	0.64	0.45455
18	32	65	33	12.2	149	0.48529
19	28	65	37	16.2	262	0.51389
20	32	68	36	15.2	231	0.52941
21	32	68	36	15.2	231	0.52941
22	56	78	22	1.2	1.44	0.5
23	48	67	19	-1.8	3.24	0.36538
24	56	86	30	9.2	84.6	0.68182
25	48	67	19	-1.8	3.24	0.36538
26	36	67	31	10.2	104	0.48438
27	36	68	32	11.2	125	0.5
28	52	78	26	5.2	27	0.54167
29	64	79	15	-5.8	33.6	0.41667
30	72	80	8	-12.8	164	0.28571
AVERAGE			20.8			0.39281
TOTAL					3581	
Standard deviation (S)					4.12	
t-COUNT			t-TABLE			
10.25257438			DK=N-1=29		α=5 %	
			2,045			

V. RESULTS AND DISCUSSION

Media plays a role in the learning process because it can represent abstract material that cannot sometimes require extra explanation [4]. The most common media is teaching the material as a learning guide. Teaching materials developed in

the form of logic gate flipbooks have characteristics; there are guidelines for the use of teaching materials that have an explanation in the content of teaching materials. Teaching materials developed in the form of logic gate Flipbooks have characteristics, there are guidelines for the use of teaching materials according to Fig. 1 which has an explanation in the content of teaching materials.

Media including textbooks helps in the implementation of learning, especially in higher education because the learning process has a short time. The aspect of fulfilling the development of teaching materials is very important to get decent and valid results. Appearance, material, language, and technical aspects are included in the assessment so it needs to be assessed by practitioners [18].

In Fig. 2 each sub material has a series that students can try out through the livewire application. Train for psychomotor and cognitive activities to explore each material being taught. Research states that there is an influence in thinking patterns of critical thinking with interactive learning processes in the classroom.

The results of this research were tested for eligibility through product validity testing by material experts, media experts, and peers. The validity of the product is developed by measuring the quality of the product and the percentage of product ideals. The recapitulation of the validation test data analysis from material experts, media experts, and peers in each aspect is presented in the following Table VI.

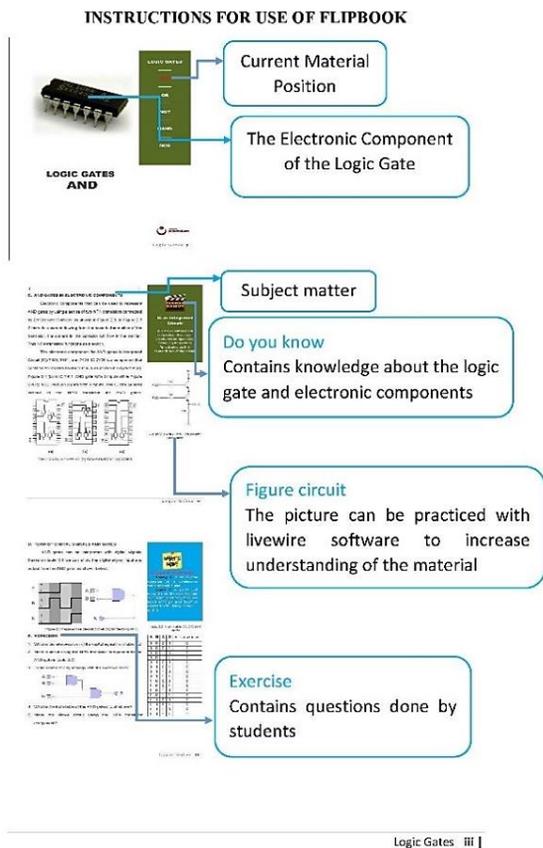


Fig. 1. Instructions for use of Teaching Materials.

C. AND GATES IN ELECTRONIC COMPONENTS

Electronic components that can be used to represent AND gates by using a series of two NPN transistors connected by Emitter and Collector as shown in Figure 2.3. In Figure 2.3 if there is a current flowing from the base to the emitter of the transistor, the current in the collector will flow in the emitter. This NPN transistor functions as a switch.

The electronic component for AND gates is Integrated Circuit (IC) 7408, 7411, and 7421. IC 7408 is a component that contains AND gates having 2 inputs as shown in Figure 2.4 (a). Figure 2.4 (b) is IC 7411 AND gate with 3 inputs while Figure 2.4 (c) is IC 7421 AND gate with 4 inputs. The IC can be used instead of the NPN transistor for AND gates.

Figure 2.4 Data information (a) IC7408 (b) IC7411 (c) IC7421

IC or Integrated Circuit

is a basic component consisting of several electronic components including transistors functioning as the center/brain of the circuit

Figure 2.3 AND Gate Circuits with Transistors

Fig. 2. Content of Flipbook Material.

TABLE VI. RECAPITULATION OF VALIDATION ANALYSIS OF MATERIAL EXPERTS, MEDIA EXPERTS, AND PEER REVIEW FOR EACH ASPECT

Aspect	Material Expert		Media Expert		Peer Review	
	\bar{X}	Category	\bar{X}	Category	\bar{X}	Category
The content aspect	7	Very good			7	Very good
Material accuracy	7	Very good			7	Very good
Stimulate curiosity	10	Very good			10	Very good
Presentation	7	Very good	16	Good	17	Very good
The use of web learning in a flipbook	16	Good	20	Very good	17	Very good
General appearance			17	Very good	16	Good
Language / Readability			9	Good	4	Very good

Each expert is given a questionnaire that shows aspects according to their expertise and then analyzed to get the validity value of the product being tested. From the results of the data taken from the expert assessment material according to Table II, validation obtained an average score of 47 which according to the attachment of the score is included in the range $\bar{X} > 45,5$ meaning in the very good category. Data taken from media experts according to Table III the results obtained an overall analysis of product validation obtained an average score of 62 which according to the attachment of the score is

included in the range $\bar{X} > 58,5$ meaning in the very good category [19]. Collecting data by peers reviews according to Table II validation of products obtained an average score is 78 wherein the score is included in the range of $\bar{X} > 75$ means in the excellent category.

After analysis of the average score of validation data, then analyzed the percentage of ideals of the product. The percentage of product ideals by material experts that is 83.92% is included in the range of the percentage score $\bar{X} > 81,25$ % in the very good category. Percentage of product ideals by media experts calculated according to overall aspect criteria is 80% included in the range of percentage $62,5\% < \bar{X} < 81,25$ % in the good category. The calculation of the overall percentage of product ideals for peers found 84.78% included in the range of score percentage $\bar{X} > 81,25$ % in the very good category.

From the calculation results that have been presented both product quality analysis and percentage analysis of ideals, it is found that the flipbook gate logic web-assisted web learning products are in the very good category. The conclusion is that the product is feasible or valid to be tested and used. After product development and validity testing, it is then implemented in small groups. The first product trial was conducted at informatics engineering students for upper semester classes who already knew digital material. The trial was conducted 15 samples which obtained an average score of 81% included in the range $\bar{X} > 81.25\%$ meaning that in the good category. Recapitulation of student response data analysis in each aspect is presented in Table VII.

From Table VII shows that student responses from each aspect show that the average product is considered by the sample of users included good category. Then it can be concluded that from the data that the product was received then it could be continued for use to determine the effectiveness of the product. Further implementation to find out the increase and effectiveness of product use. In accordance with the analysis of the data shows that the use of flipbook gate logic assisted by web learning increases the ability of students to think logically by 20.8%. Then from the results of t-test calculations for two groups of data from one paired sample group shows the value of t-count 10.25 which means t-count > t-table, where $10.25 > 2.045$ then H_0 is rejected. It can be concluded that there is a difference in the average value between before and after using the flipbook gate logic assisted web learning, which shows that after the use of products the ability of logical thinking increases. In line with the research of Divayana et al [20] shows that in the development of flipbooks as a digital book design in both categories as a source of teaching.

Reinforced by the results of the N-GAIN analysis in accordance with Appendix 13, the pretest and posttest values had an N-Gain value of 0.39 which included in the range of $0.7 > g \geq 0.3$ moderate criteria. These results indicate that the flipbook gate logic is assisted by web learning to increase the ability of logical thinking to be effective and appropriate for use in the lecture process. Supported by research on the effectiveness of web-based learning support in the learning process because the process is easy and has unlimited access [21].

TABLE. VII. PERCENTAGE OF RESPONSE DATA FOR EACH ASPECT

No	Aspect	Percentage of the ideal score (%)	Category
1	Stimulate curiosity	80,83	Good
2	Presentation	81,66	Very Good
3	The use of web learning in a flipbook	80,41	Good
4	General appearance	80	Good
5	Language / Readability	80,83	Good

VI. CONCLUSION

Based on the results of data analysis and discussions that have been carried out, it can be concluded that the results of the validation of material experts, media experts and peers show the products in the excellent category. Then from the first product trial conducted in informatics engineering students obtained an average score of 81% included in the range $\bar{X} > 81.25\%$ meaning in the good category. The results of the t-test calculations show t-count > t-table, where $10.25 > 2.045$, the use of flipbook gate logic assisted with web learning increases the ability to think logically. And the analysis of N-Gain 0.39 including medium criteria, then the flipbook gate logic assisted with web learning to increase the ability to think logically effective.

Further research can be developed as follows:

- 1) Developing more interactive E-learning by involving many interpretations.
- 2) Looking for influence from the positive and negative impacts of developments in the current digitalization era.
- 3) Development of software programs for learning.

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