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Analysis of critical thinking skills, cognitive learning outcomes, and student activities in learning the human excretory system using an interactive flipbook

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ABSTRACT

This study aims to: (1) analyze the achievement of critical thinking skills, (2) analyze the achievement of cognitive learning outcomes, (3) determine the learning activities carried out, and (4) determine student responses to the use of interactive flipbook media. This study is Quasi Experiment research with a posttest-only control design employing a purposive sampling technique. The data in this study are (1) data on the achievement of critical thinking ability indicators, (2) data on achievement of cognitive levels (C4, C5, and C6), (3) data on student learning activities carried out, and (4) data on student responses to use of interactive flipbook media. The instruments used are (1) critical thinking tests in the form of description questions, (2) cognitive learning outcomes tests in the form of multiple-choice questions, (3) student activity observation sheets, and (4) student response questionnaires. The results obtained in learning the human excretory system using interactive flipbooks are: (1) the level of achievement of critical thinking skills on each indicator can be achieved well, (2)the level achievement of cognitive learning outcomes (C4, C5, and C6) in each category can be achieved well, (3) learning activities that appear and implement in the learning process include visual activities, oral activities, and listening activities, and (4) the use of interactive flipbook media gets a positive response from students. Most respondents agree to use interactive flipbook media to learn the human excretory system. Students also assess that interactive flipbook media are interesting, flexible, practical, meaningful, and not dull.

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INTRODUCTION

The 21st century is marked by the era of the industrial revolution 4.0 and is referred to as the century of globalization. Many changes occur in all aspects of life, including the field of education. The government has made changes to the education curriculum. Starting from 2013 curriculum accommodates 21st-century skills with goals based on 4C abilities, namely communication, collaboration, critical thinking, and creativity (Damayanti & Raharjo, 2020). The new curriculum, which is currently starting to implement, is the Merdeka Curriculum with the primary objective of overcoming the learning crisis through the formation of the Pancasila (five pillars of Indonesia) profile character, independence, critical reasoning, global diversity, mutual assistance, creativity, literacy improvement, and numeracy for primary and secondary levels (Ministry of Education and Culture, 2022).

Based on the objectives of the educational curriculum, one of the essential skills that students must have is the ability to think critically. Thinking critically is very important and closely

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related to efforts to develop professional competence (Assessment Day, 2022). Critical thinking is essential in the world of education because it can equip students with the skills and dispositions they command to answer the world's challenges (Liang & Fung, 2020). By thinking critically and analyzing the suitable logic, students can communicate in a directed manner and create good collaboration (Halim, 2022). Critical thinking is an active, coordinated, complex process, such as reading and writing, speaking and listening, which involves thinking that ends in reasoned decisions (Florea & Hurjui, 2015). According to Facione (2015), critical thinking skills are based on six indicators: interpretation, analysis, conclusion, evaluation, explanation, and self-regulation. The priority of educational institutions is to produce graduates with high thinking skills, which must be emphasized in every school curriculum.

The results of the PISA evaluation, which emphasizes literacy and numeracy measurements, show that students' critical thinking skills in Indonesia are still relatively low (Ministry of Education and Culture, 2022). Of the 79 countries evaluated, Indonesia's science value ranks 70th (OECD, 2016). The ability to think critically has a relationship with the learning process. If students' critical thinking skills are good, they can overcome existing problems. Good critical thinking skills can also increase student activity and affect one of the outputs in the learning process, namely cognitive learning outcomes. Critical thinking skills can affect the quality and quantity of student learning outcomes (Aini, 2013). Critical thinking also has a positive and significant relationship with academic achievement (Varenina et al., 2021). Increased student activity is in line with increasing student understanding of the material (Istiana et al., 2015).

In learning biology, critical thinking skills are essential competencies to be developed because biology is a part of science that examines various abstract and procedural sciences. In biology, scientific terms are used to express concepts or ideas. The use of scientific terms is often perceived by students as something that they understand in learning. This often causes students to experience misconceptions, so students' critical thinking skills are low. One of the materials in biology learning that is difficult to teach in SMA (High School) class XI, is the Human Excretion System. In the topic of Human Excretory System, various scientific terms and bioprocess mechanismsare studied. In the learning process, students need to have mastery of scientific concepts in a good category. Students with good mastery of scientific concepts will more easily develop the skills needed to think critically (Ismail et al., 2018). Students with good mastery of scientific concepts will find it easier to develop the skills needed for critical thinking (Ismail et al., 2018).

Based on observations in a high school in Klaten Regency, it was found that the learning process was not optimal. It can be seen from the learning activities that are still teacher-centered, the learning media has not been maximized (PowerPoint or scanned books into PDF), student activities are relatively low, and difficult for teachers to realize students with good critical thinking skills. The point that underlies these problems is the students' inadequate understanding of the material being studied. Optimizing literacy can be an effort to improve students' learning. Reading can increase knowledge and insight; with broad knowledge and wisdom, the way of thinking will develop sufficiently to connect every detail of the problems encountered to find the right solution (Muhammad et al., 2019).

To optimize literacy, appropriate and innovative learning media are needed so that students are interested and motivated to learn. Learning media that supports being used according to the times are digital learning media. This type of media led to the industrial revolution 4.0, where significant changes occur in various fields through a combination of technology (Oktavian & Aldya, 2020). One of the technologies that can be used to design electronic teaching materials is a flipbook. According to Rusnilawati and Gustiana (2017) by using a flipbook, teachers can present more interesting electronic teaching materials. Wibowo and Pratiwi (2018) also argue that flipbooks can make learning media interactive because there are moving animations, videos, audio, and so on, so that learning becomes more exciting and not monotonous.

In addition to learning media, appropriate learning models and learning methods are needed. The PBL learning model combined with the question and answer method is the right solution

to assist the learning process with the aim of increasing critical thinking and student activities. PBL learning is based on a contextual problem-solving process so that it requires critical thinking skills by expressing more cognitive aspects (Apriyani et al., 2017). Through the question and answer method, student participation is greater and they try to listen to the teacher's questions well and try to give the right answers (Dewi & Kristin, 2017). Aminah (2018) says that learning will be more meaningful by producing learning experiences through exchanging opinions, so that it can stimulate students' learning motivation and thinking.

From the aforementioned opinion, critical thinking skills are important in learning because it affects students' cognitive learning activities and outcomes. To improve critical thinking skills, a good understanding of concepts is needed. The application of interactive flipbook media with the PBL learning model combined with the question and answer method is expected to help improve understanding of the material, so that the achievement of critical thinking skills, learning activities and student cognitive learning outcomes can be maximized. This study aims to: (1) determine the achievement of each indicator of critical thinking ability in learning the material of the human excretory system using interactive flipbook media, (2) find out the achievement of each category of dimensions of the cognitive development process in learning the material of the human excretory system using interactive flipbook media, (3) knowing the types of physical activities carried out during the learning process of excretory system materials using interactive flipbook media, and (4) knowing students' responses to interactive flipbook learning media.

METHOD

This research was conducted on March 1 – March 31, 2022, in one of the public high schools in Klaten Regency, Central Java, Indonesia. The type of research used is the Quasi Experiment with a posttest-only control design. The sample used in this study consisted of three classes with a total of 108 students. The sampling technique used was purposive sampling, by selecting classes with different biology learning schedules. Determination of the experimental class and control class from three samples was carried out by selecting one practical class from the class taught by biology teacher A and one experimental class from the class taught by biology teacher B. From this sampling, class XI MIPA 1 and XI MIPA 6 were used as the experimental class (applying interactive flipbook media), and class XI MIPA 3 used as the control class with regular learning media treatment used in high school.

The data collected were: (1) data on the achievement of critical thinking skills, (2) data on the achievement of cognitive learning outcomes, (3) data on the types of learning activities carried out, and (4) data on student approval responses to the use of interactive flipbook media. The instruments in this study consisted of test instruments and non-test instruments, namely: (1) critical thinking ability test instruments in the form of six description questions arranged based on critical thinking indicators according to Facione (2015), (2) cognitive learning outcomes test instruments in the form of posttest 27 questions (category C4 , C5, and C6), (3) instrument of observation sheet on the implementation of physical activity (indicators: visual activity, oral activity and listening activity), and (4) instrument of student consent questionnaire on interactive flipbook media. The data analysis technique used to analyze the implementation of student activities is descriptive analysis technique. The technique used to analyze the data on the achievement of indicators of critical thinking skills and the achievement of students' cognitive learning outcomes is descriptive statistical analysis technique (%). Calculations can be performed using the Excel computer program with Formula (1).

$$\frac{\sum \textit{total score of students on each indicator achieved}}{\sum \textit{maximum score obtained on each measured indicator}} \; x\; 100\% \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

In the next step, the percentage of students' critical thinking ability achievement is classified by referring to the achievement criteria in Table 1.

Table 1. Criteria for the Category of Critical Thinking Skills

Percentage (%)	Category
81-100	Very good
61-80	Good
41-60	Fair
21-40	Poor
0-20	Very poor

Source : Riduwan (in Meriyanti et al., 2021)

The data analysis technique used to analyze student response data to interactive flipbook media is the descriptive statistical analysis technique (%). Calculations can be done using the Microsoft Excel computer program with Formula (2).

$$= \frac{\sum the\ number\ of\ respondents\ in\ each\ category\ (strongly\ agree, agree, disagree, disagree))}{\sum total\ number\ of\ respondents} x\ 100\% \quad \ldots. (2)$$

FINDINGS AND DISCUSSION

In this section, the results and discussion of the research are presented, which include: (1) data on the achievement of critical thinking skills, (2) data on the achievement of cognitive learning outcomes, (3) data on learning activities carried out, (4) data on the percentage of student approval responses to learning human excretory system uses interactive flipbook media.

Critical Thinking Skills

The achievement of critical thinking skills in this study was seen from the achievement of critical thinking skills indicators. Indicators of critical thinking skills analyzed in this study are based on indicators of critical thinking skills from Facione (2015), namely Interpretation, Analysis, Evaluation, Inference, Explanation, and Self-Regulation.

Table 2. Level of Achievement Indicators of Students' Critical Thinking Skills

Indicators & Sub-indicators of Critical Thinking Skills	Percentage (%) and Category of Achievement Indicators in Class Students		
	XI MIPA 1*	XI MIPA 6*	XI MIPA 3**
Interpretation	64.6	78.5	58.8
Presenting meaning	(Good)	(Good)	(Fair)
Analysis	71.5	75.7	68.4
Recognizing arguments	(Good)	(Good)	(Good)
Evaluation	73.6	75.0	72.8
Assessing the credibility of the statement	(Good)	(Good)	(Good)
Inference	79.9	73.6	71.3
Questioning evidence, conjecturing alternatives or drawing conclusions	(Good)	(Good)	(Good)
Explanation	91.0	94.4	77.9
Support procedure	(Very Good)	(Very Good)	(Good)
Self-control	81.9	85.4	64.7
Statement review	(Very Good)	(Very Good)	(Good)

Note: (*) experimental class; (**) control class

The data at Table 2 shows that the achievement of critical thinking ability indicators in the experimental class is better than the achievement in the control class. In the interpretation indicator, the achievement category in both experimental classes is good, while in the control class, it is sufficient. Interpretive ability is the ability to understand the meaning of a problem. Regarding interpretation indicators, students are asked to understand and explain the data on urine test results. The indicator of interpretation is achieved with the criteria of writing down the answers

to the questions clearly and precisely. It takes a high ability to understand the material to be able to meet these indicators by applying the concepts they have to several meanings. The aforementioned statement follows the results of the study (Hayudiyani et al., 2017) that students with high abilities can solve problems correctly and understand the importance of the questions properly.

In the analysis indicators, the achievement category in the experimental class and the control class is included in the good category. However, the percentage of indicator achievement in the experimental class is higher than in control class. Analytical skills are skills to identify the desired inferential relationship between descriptions, concepts, questions, statements, or other forms of representation (Solikhin & Fauziah, 2021). In the analysis indicator questions, students are asked to identify two statements regarding the ADH hormone. Indicators of analysis are achieved with the criteria of being able to write conclusions from the relationships of the concepts provided clearly. It takes a high ability to understand the material to be able to meet these indicators. Hayudiyani et al. (2017) state that students with high skills can provide conclusions from the relationship between information about questions well.

In the evaluation indicators, the achievement category in the experimental class and the control class is categorized as 'good'. However, there is a difference in the percentage value of indicator achievement where the experimental class is higher than the control class. Evaluation is the ability to assess the credibility of statements or descriptions about a person's perceptions, experiences, situations, judgments, beliefs, or opinions. In the evaluation indicator questions, students are asked to provide assessments and explanations supporting the articles regarding emotional factors that affect sweat production. The evaluation indicator is achieved with the criteria of being able to write down the problem solving with clear and precise arguments. It takes a high understanding of the material to be able to meet these indicators. Hayudiyani et al. (2017) state that students with high abilities can write problem-solving correctly.

In the inference indicator, the achievement category in the experimental class and the control class is in a good category. However, the percentage of indicator achievement in the experimental class is higher than in the control class. The inference is the ability to conclude something based on logical thinking. In the question of inference indicators, students are asked to do a simple experiment to prove that the lungs excrete water vapor. The inference indicator is achieved with the criteria of being able to write problem formulations, hypotheses, work procedures and conclude the results obtained logically and correctly. According to Ennis (Hartati et al., 2019), the right conclusion must be based on the steps of logical conclusion reasons. It takes a high understanding of the material to be able to meet these indicators by concluding the answers that have been completed. Hayudiyani et al. (2017) state that students with high abilities can identify and obtain the elements needed to draw conclusions.

In the explanation indicator, the achievement category in the experimental class is in the very good category, while the control class is in the good category. The ability to explain is the ability to state the results of thoughts, explanations of reasons based on consideration of the evidence, methodological concepts, criteria, and context. In the problem of explanation indicators, students are asked to analyze the typical decline in kidney function and explain technological procedures that can help to overcome these problems. The explanation indicator is achieved with the criteria of being able to write correctly explaining the procedure based on the findings. It takes a high understanding of the material to be able to meet these indicators. Hayudiyani et al. (2017) state that students with high abilities can explain logically based on the results obtained.

In the self-control indicator, the achievement category in the experimental class is in the very good category, while the control class is in the good category. Self-regulation ability is the ability of students to review the answers that have been given or written. Questions about self-regulation indicators include tips on drinking enough water to maintain kidney health. In this question, students were asked to rate these tips for their kidneys. Indicators of self-regulation are achieved with the criteria of being able to present an assessment in terms of articles, suggestions, and self-reflection. It takes a high level of understanding of the material to be able to meet these

indicators by applying the acquired skills in analyzing and evaluating. Hayudiyani et al. (2017) state that students with high abilities can review the answers that have been written.

Based on the discussion of each indicator of critical thinking ability, the percentage of achievement of critical thinking indicators in the experimental class by applying interactive flipbook media is higher than in the control class, which uses regular media applied in local biology learning. It shows that the application of interactive flipbook media helps students understand the material of the human excretory system. This statement is supported by Andarini et al. (2013) that flipbooks can increase students' mastery of abstract things or events that cannot be presented in class. The presentation component in the flash flipbook can also encourage critical thinking skills, develop cognitive, affective, and psychomotor abilities, and can increase students' interest and motivation to learn (Hendi et al., 2020). Flipbook components that can increase students' interest in studying the human excretory system include images, videos, text, links to literature review journals, quizzes, colors, and designs from interactive flipbook learning media. The results of the research above, are supported by the results of the student approval questionnaire (Table 5) statements numbers 5 and 6, namely 100% of students agree that interactive flipbook media increase their knowledge and insight about the human excretory system material and the use of pictures and videos in interactive flipbook media is very important relevant and helps facilitate understanding of the material. Based on the aforementioned description, the interactive flipbook learning media used by students can help students understand the material of the human excretory system better. This causes them to obtain better learning outcomes when compared to the learning outcomes of students who do not use interactive flipbook learning media.

Cognitive Learning Outcomes

This study's achievement of cognitive learning outcomes was seen from the achievement at the cognitive level of C4, C5, and C6. Data on the level of achievement of cognitive learning outcomes (experimental class and control class), are presented in Table 3. The data (Table 3) shows that the achievement of the dimensions of cognitive learning outcomes in the experimental class is better than the achievement in the control class. Indicator C4 (analysis) is a person's ability to detail or describe something in smaller parts and can understand the relationship between the parts or between one factor and another. To achieve analytical skills on the material of the human excretory system, a coherent understanding is needed so that students can analyze the relationship of each component or factor related to the human excretory system. Based on the questions in the C4 category after being analyzed by the researcher, the experimental class has a higher achievement percentage than control class, which is in the good category with a percentage of 63.27% and 79.94%, while control class is in the sufficient category with a percentage of 46.30%.

Table 3. Level of Achievement of Student Cognitive Learning Outcomes

Cognitive level	Percentage and category of achievement (%) of C4, C5 and C6 abilities in grade students					
	XI MIPA 1*		XI MIPA 6*		XI MIPA 3**	
	%	category	%	category	%	category
C4 (Analysis)	63.27	Good	79.94	Good	46.30	Fair
C5 (Evaluation)	65.12	Good	79.63	Good	48.15	Fair
C6 (Produce)	74.38	Good	84.26	Very Good	66.98	Good

Note: (*) experimental class;(**) control class

Indicator C5 (evaluation) is the ability to judge or assess based on existing criteria and standards. Evaluating includes the cognitive process of examining and critiquing (Effendi, 2017). To achieve the ability to assess the material of the human excretory system, a good understanding is needed to be able to examine the problems given critically. Evaluation skills require good knowledge to be able to make judgments and judgments based on the theory that has been studied. Based on the C5 indicator questions after being analyzed by the researcher, the experimental class

has higher achievement than the control class, which is in the good category with a percentage of 65.12% and 79.63% while the control class is a sufficient category with a percentage of 48.15%. Indicator C6 (create) is the process of arranging elements into a coherent or functional whole. Creating contains three cognitive processes: formulating, planning, and producing (Oktaviana & Prihatin, 2018). Based on the questions at cognitive level C6 after being analyzed by researchers, the experimental class XI MIPA 1 has a good achievement category with a percentage of 74.38% and class XI MIPA 6 has a very good achievement category with a percentage of 84.26% while the control class is a good category with a percentage 66.98%.

The data shows that the achievement percentage of the cognitive development process dimension category (C4, C5, and C6) in the experimental class is better than in the control class. This difference in the percentage of achievement cannot be separated from the influence of the application of interactive flipbook media. It is in line with a research by Audie (2019) which states that one of the factors that influence the improvement of student learning outcomes and motivation is learning media that is attractive and easy to use so that students are easier to remember the knowledge contained in the media. In this study, it is also supported by student answers to the student response questionnaire on interactive flipbook media, namely 96.42% of students overall agree with eight statements in the questionnaire that learning using interactive flipbook media is more interesting, motivating, easy to understand, and not dull. Interactive flipbook learning media in the subject of the human excretory system can motivate students and help them remember the knowledge obtained so that the level of achievement of the dimensions of the students' cognitive development process is maximized. Based on the description above, it can be said that interactive flipbook learning media of the human excretory system can motivate students and help them achieve an optimal level of cognitive development.

Student Activities

Student learning activities observed in this study were physical activities, which included visual activities, oral activities, and listening activities with several activity sub-indicators that had been adapted to the learning situation and conditions. The various indicators of physical activity observed are presented in Table 4.

Table 4. Student Activity Indicator

Indicator	Observed Aspects
Visual activities	1. Reading information or learning materials
	2. Pay attention to the teacher's explanation
	a. Students pay close attention when the teacher explains
	b. Students concentrate and focus in class
	3. Perceive picture or illustration
	a. Students pay close attention to the video/pictures presented by the teacher
Oral activities	1. Asking question
	a. Students ask the teacher questions about the material that has not been understood.
	b. Students ask each other questions with other friends about the subject matter
	2. Expressing opinion
	a. Students respond to statements given by the teacher
	b. Students respond to questions given by friends
	c. Students and teachers draw conclusions from the learning material
Listening activities	1. Listening to the presentation of materials
	a. Students listen to the explanation of the video/image presented
	b. Students listen to the material delivered by the teacher without doing negative activities

Note: The indicator is modified from the observation instrument for student learning activities from (Maulita, 2019)

Based on the indicators of student activity in Table 4, student activities (experimental class and control class) can be described as follows: (1) In the experimental class all observed activities

(visual act, oral act, listening act) were observed and are carried out in the learning process. (2) In the control class, the activities that appear and are carried out are the visual act and the listening act. The oral act sub-indicator, namely asking questions at the 2nd point (Students ask each other questions and answers with other friends about the subject matter) and the sub-indicator expressing opinions at the 3rd point (Students and teachers draw conclusions from the learning material) did not work well at the first meeting and the second meeting.

Based on the results of observations, it can be seen that there are differences in student activities carried out during the learning process in the experimental class and the control class. The difference lies in the oral activity indicator. The indicator contains two sub-indicators, namely asking questions and expressing opinions. Oral activity indicator is an indicator that shows the level of students' understanding of the material. In this study, efforts to improve understanding of the material were carried out by using interactive flipbook learning media in the experimental class. In practice, interactive flipbook media are distributed to students two days before the learning activity takes place. It is intended that students prepare themselves before learning begins, by conducting independent learning using interactive flipbook media. With this conditioning, students will be more confident in learning in class. This shows that the use of interactive flipbook media can improve students' understanding of the material.

The level of student understanding can be seen from student's activities during the learning process. The increase in student learning activities is in line with student learning outcomes in a material (Istiana et al., 2015). From this statement, it is understood that student activities during the learning process can show students' understanding of a material. Students with a good understanding of the material will be more active in the learning process. Activity is the most important part in the learning process since it shows students' understanding and knowledge (Prijanto & De Kock, 2021). Students are said to be active if behavioral characteristics are found such as frequently asking the teacher or other students, willing to do the assignments given by the teacher, able to answer questions, happy to be given learning assignments, and so on (Gunawan, 2018). Higher student activity in the experimental class shows that students can learn and understand well the excretory system material presented in interactive flipbook media. This statement is in line with the research of Maesaroh et al. (2022) which states that there is a positive influence from the use of flipbooks on increasing the ability to understand concepts. Yulaika et al. (2020) state that the use of flipbooks helps improve student activities including visual, oral (asking, expressing opinions, participating in discussions enthusiastically), listening, writing and emotional. Based on the aforementioned description, it can be said that the interactive flipbook media used by students can facilitate them to carry out various learning activities according to expectations. This causes them to have good mastery of the concept of the human excretory system.

Student Response

Student response (approval) to interactive flipbook learning media was measured using a questionnaire. This questionnaire consists of eight statements. The results of the response data analysis (student approval level) to the use of interactive flipbook media are presented in Table 5.

Based on the data in Table 5, almost 100% of students agree to use interactive flipbook media. Interactive flipbook media is considered to be able to improve students' understanding of the material. It is evidenced by the difference in the achievement of critical thinking skills and cognitive learning outcomes, as well as the implementation of student activities, where the experimental class is superior to the control class. According to Fahmi and Priwantororo (2019), learning media equipped with colored text, video, animation, and audio allow interactive learning because it involves adaptive, visual, and kinetic learning styles, making it easier for students to receive the material. According to Setiawan et al. (2020), interactive flipbook learning media can improve the quality of learning and understanding of the material and increase student motivation to learn through attractive media displays. Student learning outcomes are reflected through student activities during the learning process. Low student learning activities will cause low stu-

dent learning outcomes (Indrastuti et al., 2017). The achievement of students' cognitive learning outcomes is influenced by their metacognitive and critical thinking skills, in other words, the better the students' metacognitive and critical thinking skills, the better their cognitive learning outcomes (Wicaksono, 2014). Other research states that there is a positive correlation between critical thinking and student learning outcomes. Learning that focuses on thinking skills, especially critical thinking, is one way to improve student learning outcomes (Annisa et al., 2020).

Table 5. Student Approval Rate (%) Against the Use of Interactive Flipbook Media

No.	Statement	Agree		Disagree	
		Resp	Result (%)	Resp	Result (%)
1.	Learning using interactive flipbook media is more interesting and fun	68	100	0	0
2.	Learning using interactive flipbook media is more interesting and fun	66	97.05	2	2.95
3.	Interactive flipbook media is very effective and flexible to learn	65	95.59	3	4.41
4.	I can understand the human excretory system material easily through interactive flipbook media	65	95.59	3	4.41
5.	The interactive flipbook adds to my knowledge and insight into the material of the human excretory system	68	100	0	0
6.	The use of images and videos in interactive flipbook media is very relevant and helps facilitate understanding of the material	68	100	0	0
7.	Interactive flipbook media fosters my critical thinking skills through existing materials and questions (explanations and quizzes).	65	95.59	3	4.41
8.	Learning to use interactive flipbook media is less boring and more meaningful	61	89.71	7	10.29
	Total	**526**	**771.43**	**18**	**26.47**
	Average	**96.42%**		**3.05%**	

Note: *resp = respondent

Based on these findings, interactive flipbook media plays a very important role in the learning process. The application of interactive flipbook learning media can help students better understand the material, and cause students' critical thinking skills to emerge so that students have a high curiosity. This positively impacts student activities, where students will be actively involved in asking and answering questions in class learning. This series of processes ultimately produces good cognitive learning outcomes. Given the significant influence of learning media on the learning process and students, it is necessary to improve and innovate to develop more interactive learning media so students are motivated and easy to understand learning materials. From the acquisition of student responses, it can be concluded that students feel interested and motivated to learn. Students also assessed that interactive flipbook media was flexible (teaching and learning process could take place anywhere as long as it was conducive and could help to focus), effective (can accelerate students' understanding through audio-visual elements), meaningful (knowledge gained after studying interactive flipbook media can be applied) in everyday life), and not boring.

CONCLUSION

Based on the research that has been done on excretory system learning using interactive flipbook media, it can be concluded that: (1) The level of achievement of students' critical thinking skills on each indicator can be achieved well. (2) The level of achievement of students' cognitive learning outcomes (C4, C5 and C6) for each category can be achieved well. (3) Learning activities that appear and are implemented in the learning process include visual activities, oral activities, and listening activities. (4) The use of interactive flipbook media received a positive response from students. Almost all respondents agreed to use interactive flipbook media in learning the human excretory system. Students stated that flipbook media was interesting and motivated. Students also assessed that the interactive flipbook media was flexible, effective, meaningful, and not boring in learning the human excretory system using interactive flipbook media.

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