

Students' Critical Reasoning Skills in Integrated Human Reproductive System Learning with Al-Quranic Values

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Abstract: Along with the development of the era, the emergence of the free sex phenomenon that can have an impact on the reproductive health of students. This proves a decline in character that is not in accordance with the profile of Pancasila students. To improve the profile of Pancasila students, a learning device that is integrated with the Qur'an in the material of the Human reproductive system was developed. In this study, to determine the effectiveness of the biology learning device integrated with the Qur'an in the material of the human reproductive system can improve the profile of Pancasila students, especially in the dimension of critical reasoning skills. The learning device was developed in a development research or Research and Development (R & D) using the ADDIE design, in grade IX students of MTs Al Furqon. The samples used in the study were two classes, namely the experimental class and the control class using purposive sampling techniques. To measure the level of critical reasoning skills of students using pre-test and post-test questions. The data analysis technique used N-Gain to determine the effectiveness of the learning device. The results of the N-Gain percentage of the experimental class were 65.58%, while for the control class it was 44.03%. The integrated biology learning device of the Qur'an on the Human Reproductive System Material is stated to be quite effective in improving the profile of Pancasila students in the critical reasoning dimension.

Keywords: Learning Device, Al-Qur'an Integration, Human Reproductive System, Pancasila Student Profile, Critical Reasoning Skill

1. INTRODUCTION

Indonesia has formulate objective education national that is form human character, faith and devotion to God Almighty as well morals noble (Stai & Al Ayyubi, nd). In the Independent Curriculum, the implementation objective education the loaded in form profile students Pancasila (Dalhuman et al., 2022; Santika, 2022). Profile students Pancasila is ideal picture of character and competencies that must be owned by students who integrate values Pancasila with 21st Century Skills. Profile students Pancasila form a individual students throughout life, competence, character, and behavior in accordance with values Pancasila. Students who

have own character in profile Pancasila students are expected can face challenges and problems life everyday. This in accordance with principle in development profile Pancasila students, namely meaningful contextual can finish problem real in life daily students. One of them problems faced student that is emergence phenomenon *free sex* along with impact negative impacts that accompany it. the among them transmission disease sexual intercourse and unplanned pregnancy desired (Resky et al., n.d.; Setyawan et al., 2019). Data from the BKKBN in 2022 shows that there are 1 million incident pregnancy outside of marriage ([Badan kependudukan dan Keluarga Berencana](#)

[Nasional, 2023](#); [Sari & Astuti, 2022](#)). Risks pregnancy premarital sex among teenagers can result in death, depression and sanctions social ([Handayani et al., 2024](#); [Indarti et al., 2020](#)). Another impact is existence transmission disease sexual including HIV/AIDS, even findings case This reaching 30% at the age of teenagers in Indonesia ([Buaton et al., 2019](#); A. [Fitriani, n.d.](#); [Fitriani & Salim, 2021](#)). The causes is lack of parental attention, influence Friend close, social interaction that is not well, feeling of wanting know, and lack of religious knowledge ([Anwar et al., 2019](#)). Another cause is lack of information or proper education about health system reproduction Human beings. Based on Survey Indonesian Demographic and Health Survey (IDHS) 2021 level knowledge teenager about health reproduction Still low with results of 74 teenagers men and 75 teenagers women in Indonesia do not own sufficient knowledge about health reproduction ([Aryani et al., 2022](#); [Handayani et al., 2024](#)). With give accurate information expected will own attitude and behavior positive behavior as well as responsible answer to system reproduction Alone ([Dungga & Ihsan, 2023](#); [Ningsih et al., 2022](#)).

The emergence phenomenon the hinting existence decline character in teenagers who are not in accordance with profile students Pancasila. In overcoming decline character the can done with give clear information or education and planting religious values to student through activity learning biology. In the activity learning the with referring to the guidelines life human through something design learning biology material system reproduction integrated Human with values contained in the Qur'an ([Iryani, 2017](#); [Nasution, 2020](#)). One of form design developed learning that is in the form of device learning. In device developed learning namely on the material system reproduction human with integrate related verses of the Qur'an with effort prevention self from socializing free. Integrate verses of the Qur'an in learning expected can increase faith student so that can prevent self from socializing free ([Ayunda, 2023](#); [Yaqin et al., 2020](#)). Activity learning the dehumand student for winged critical in analyze related verses of the Qur'an with effort prevention self from impact socializing free. In case this can also hone critical reasoning skills students who are

one of the dimensions in profile Pancasila students. The learning that is developed in the form of device learning Biology integrated the Qur'an into the material system reproduction Human beings who can increase profile Pancasila students dimension critical reasoning skills. Device developed learning that is in the form of material reading, LKPD and questions.

Based on the results of observations, so far teachers have never developed learning tools that are integrated with the Qur'an for the human reproductive system material ([Ataji, 2019](#)). Problems in study This that is how is it effectiveness device learning biology integrated the Qur'an into the material system reproduction human can increase profile Pancasila students especially in dimensions critical reasoning skills. The aim of this study was to determine the effectiveness of the integrated biology learning device of the Al-Quran on the material of the human reproductive system in improving the profile of Pancasila students, especially in the dimension of critical reasoning skills.

2. RESEARCH METHOD

Device learning Biology integrated Al-Quran has developed in something series study development or *Research and Development* (R & D). Using ADDIE design is from *Analyze, Design, Development, Implementation, and Evaluating* ([Sugiyono, 2019](#)). The learning tools were applied to grade IX students of MTs Al Furqon. The samples in the study were taken from two classes, namely the experimental class and the control class. The sampling technique subject that is Purposive *sampling is* a sampling technique based on specific considerations. The instrument used was a descriptive post-test. Question validation was carried out by testing the validity of the test items using the SPSS application. To measure effectiveness, *this study* used pretests and posttests to determine students' critical reasoning skillss. The questions were developed in the form of descriptive questions with indicators according to expert Robert Ennis regarding students' critical reasoning skillss. Data analysis used N-Gain. Data analysis using N-Gain to determine the effectiveness of learning devices with the following formula:

$$N\text{ Gain} = \frac{\text{Skor Posttest} - \text{Skor Pretest}}{\text{Skor Ideal} - \text{Skor Pretest}}$$

The criteria for improving students' critical reasoning skills can be seen in table below.

Persentase (%)	Kategori
>0,70	Tinggi
0,30 – 0,70	Sedang
< 0,30	Rendah

3. RESULTS AND DISCUSSION

Effectiveness Device Science learning towards improvement profile Pancasila students dimension reasoning critical done with give instrument test with KBK indicators according to Ennis. The data presented consists of above average value overall, average value every indicators, t-test scores and N-Gain percentage.

a. Overall Average Value

The average value of Critical Reasoning Skills can be seen in table 1 below.

Table 1. Average Critical Reasoning Skills Score

Activity	Class	N	Average
<i>Pre-test</i>	Experiment	37	37.57
	Control	36	36.39
<i>Post-test</i>	Experiment	37	78.51
	Control	36	55.83

The data is also presented in the form of a bar chart as seen in Figure 1 below:

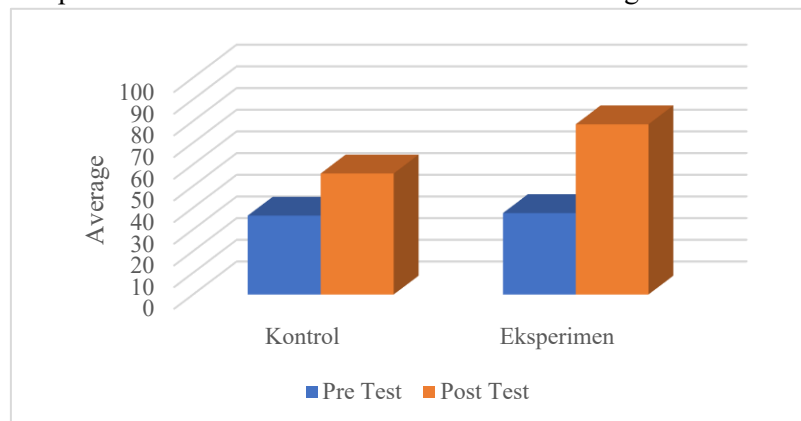


Figure 1. Diagram of Average Critical Reasoning Skills Scores

From the data presented in Table 1 and Figure 1, it can be seen that the average pre-test score for the experimental group was 55.83 and

the average score for the control group was 36.39. group post-test scores experiment of 78.51 and the average value of the group control of 37.57.

b. Average Value of Each Element in the Critical Reasoning Skills Dimension (KBK)

To obtain information on the improvement of each element of the critical reasoning dimension, the results will be presented in each KBK indicator. According to expert R. Ennis, the indicators used consist of five indicators. The presentation of each indicator can be seen in Table 2.

Table 2. Summary of Values for Each KBK Indicator

No	Indicator	Critical reasoning skills	Class Control		Class Experiment	
			Pretest	Posttest	Pretest	Posttest
1	Give Simple Explanation		41.67	70.14	45.27	89.19
2	Build Basic Skills		40.28	61.81	43.92	85.81
3	Conclude		38.89	54.17	41.22	79.73
4	Give Explanation Carry on		34.72	49.31	30.41	73.65
5	Strategy and Tactics		26.39	43.75	27.03	64.19

A summary of each indicator can be presented in Figure 2 below.

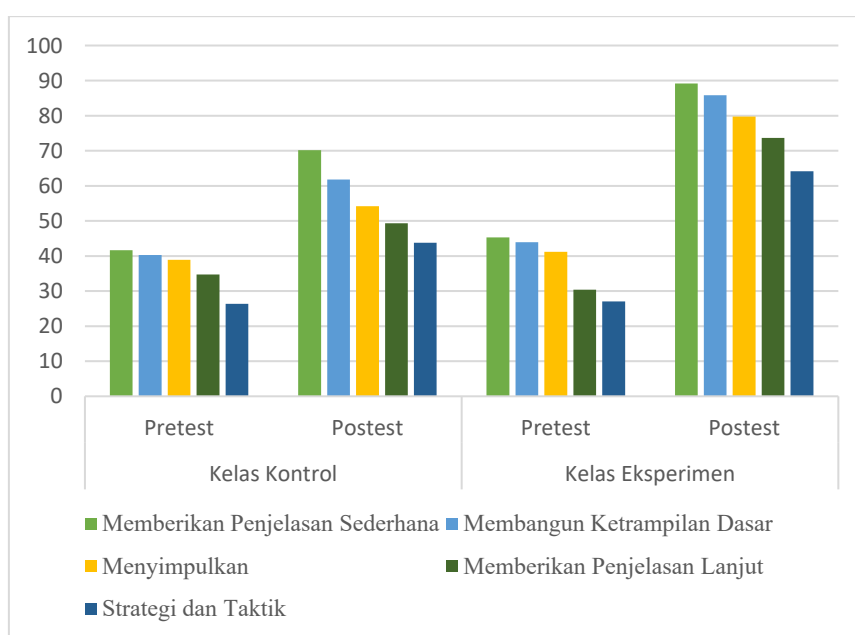


Figure 2. Summary of Values for Each KBK Indicator

From table 2 and figure 2 shows that in the indicator providing further explanation the control class pretest score 41.67; posttest 70.14, while in the experimental class the pretest score 45.27 and posttest 89.19. For the indicator building basic skills the control class pretest score 40.28; posttest 61.81, while in the experimental class the pretest score 43.92 and posttest 85.81. In the indicator concluding the control class pretest score 38.89;

posttest 54.17, while in the experimental class the pretest score 41.22 and posttest 79.73. In the indicator further explanation the control class pretest score 34.72; posttest 49.31, while in the experimental class the pretest score 30.41 and posttest 73.65. In the strategy indicator the control class pretest score 26.39; posttest 43.75, while in the experimental class the pretest value was 27.03 and posttest 64.19.

a. Results of Comparison of t-test Scores in the Critical Reasoning Skills (KBK) Dimension

Before done testing existence influence implementation Device Science learning with Improvement Ability Reasoning Critical, condition tests are carried out on group data experiments and groups control with normality test and homogeneity test. The values of normality test, homogeneity test and t-test can be seen in table 3 below.

Table 3. Results of Normality Test, Homogeneity Test and t-Test on Critical Reasoning Skills Question Scores

Activity	Class	Norm.	Hom.
Pre-Test	Experiment	0.050	0.790
	Control	0.054	
Post-Test	Experiment	0.056	0.232
	Control	0.165	

Normality Test using Shapiro-Wilk with significance of each class pre-test data experiment of 0.050, class control 0.054 while significance of post-test data for each class experiment 0.056 and class control of 0.165. While the homogeneity test Levene's test was used with the results of each pre-test significance were 0.790 and the post-test significance was 0.232.

After know condition distribution second group said, then can done SPSS calculations in class control and experiment like in Figure 3 below.

1) Results of the t-test Pretest Control – Pretest Experiment

Uji t-Test Pretest Kontrol-Eksperimen

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
NILAI	Equal variances assumed								Lower	Upper
	Equal variances not assumed									
	Equal variances assumed									
	Equal variances not assumed									

2) Results of the Experimental Pretest – Posttest t-test

Uji t-Test Pretest - Post Eksperimen

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
NILAI	Equal variances assumed								Lower	Upper
	Equal variances not assumed									
	Equal variances assumed									
	Equal variances not assumed									

3) Results of the t-test Pretest – Posttest Control

Uji t-Test Pretest Kontrol- Post Kontrol

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
NILAI	Equal variances assumed								Lower	Upper
	Equal variances not assumed									
	Equal variances assumed									
	Equal variances not assumed									

4) Results of the t-test (Posttest Control – Posttest Experiment)

Uji t-Test Posttest Kontrol-Eksperimen

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
NILAI	Equal variances assumed								Lower	Upper
	Equal variances not assumed									
	Equal variances assumed									
	Equal variances not assumed									

Figure 3. Results of t -test scores on the KBK dimension

Table 3 shows that the t-test results for the pretest and posttest control were 0.000. The t-test results for the experimental posttest and posttest control were 0.000. Meanwhile, the t-test results for the experimental pretest and posttest experiment were 0.000.

The t-test results for the pre-test data were obtained significance of 0.563. Meanwhile, the posttest data obtained a significance of 0.000.

- b. Results of the N-Gain Improvement test Critical reasoning skills (KBK) namely like Figure 4 below .

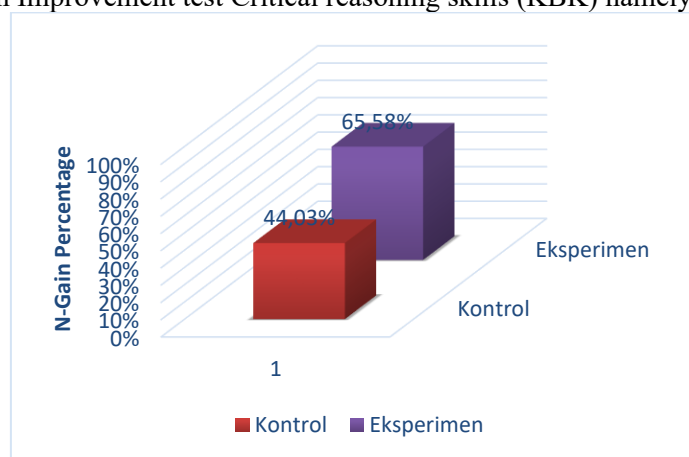


Figure 4. Results of the N - Gain Test Increased Critical reasoning skills

Results of each percentage class experiment by 65.58%, while percentage For class control by 44.03%. To obtain information about the improvement of each element of the KBK dimension, these findings will be presented in

each indicator. The indicators in this KBK have been adapted from those of expert Robert Ennis. The presentation of each indicator can be seen in Table 4 below.

Table 4. Results of Skill N-Gain Value Obtained Reasoning Critical At Every Indicator

No	Indicator KBK Dimensions	Code	N-Gain (%)			
			Control	Interpretati on	Experiment	Interpretati on
1	Give Explanation Simple	KBK 1	48.81	Currently	80.25	Tall
2	Build Basic Skills	KBK 2	36.05	Currently	74.70	Tall
3	Conclude	KBK 3	25.00	Low	65.52	Currently
4	Give Explanation Carry on	KBK 4	22.34	Low	62.14	Currently
5	Strategy and Tactics	KBK 5	23.58	Low	50.93	Currently

Results of each indicator the If served in a diagram like in the following figure 5.

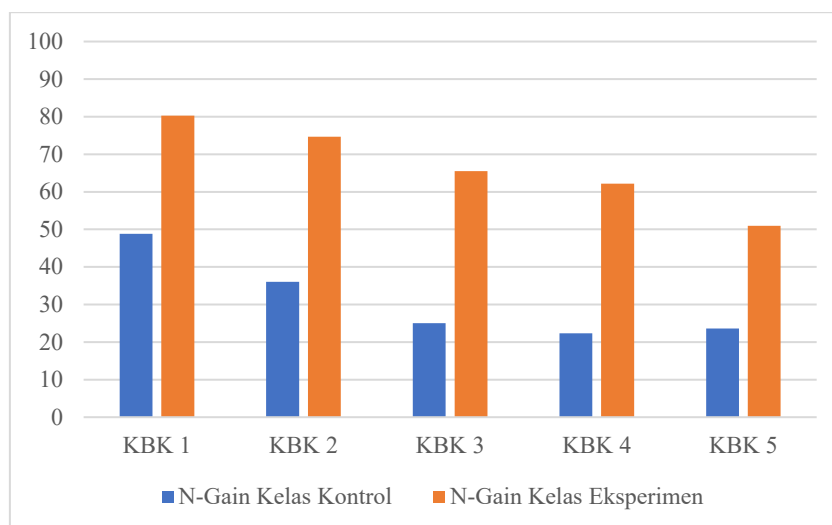


Figure 5. Skill N-Gain Value Obtaining Results Reasoning Critical Each Indicator

In dimension critical reasoning skills results obtained from each percentage class experiment by 65.58%, while percentage for class control by 44.03%. There was an increase score show that device science learning integrated with the Qur'an can increase profile students Pancasila dimensions critical reasoning skills. In dimension This student do 5 KBK questions shaped description in accordance KBK indicators from R. Ennis.

Results obtained class average grade experiment every the indicators namely on the indicator give explanation simple in class experiment pretest score 45.72 posttest 89.19. For indicator build skills base pretest score 43.92 and posttest 85.81. On the indicator conclude pretest score 41.22 posttest 79.73. Indicator give explanation carry on Pretest score 30.41, posttest 73.65. Scores on strategy and tactics indicators that is pretest score 27.03 posttest 64.19. Based on mark fifth indicator the show that the average posttest score in the class experiment highest that is indicator First give explanation simple.

Questions on indicators explanation simple moreover formerly student given something narrative about dream wet along with relevant verses of the Qur'an, students requested for make question in accordance narrative Based on that. results answers, students capable compile question with good. Indicator give explanation simple contained competence student in convey information or draft in a way simple. According to [Ennis \(2011\)](#), one of the indicator think critical

is ability explain something with simple way ([Ennis, 2011](#)). Indicators for formulating questions is ability students who are simple has understand draft structure and physiology in dream wet. In the presentation by Sugiyono that evaluation critical reasoning skills in learning can done with see How student explain something draft in a way simple make question reflective and giving easy answer understood ([Sugiyono, 2019](#)). In compiling question reflect understanding simple about structure and function in system reproduction human with use simple language in accordance understanding students. According to [Facione \(2011\)](#) ability explain something draft with simple reflect mastery in -depth material which is aspect main in critical reasoning skills ([Facione, 2011](#)).

In the book guide implementation profile students Pancasila mention that one of indicator think critical in profile students Pancasila is ability explain something in a way simple including in field science and religion ([Kemendikbudristek, 2024](#)). With student capable give explanation simple is one of the proof increasing dimensions critical reasoning skills in profile students Pancasila.

With existence intervention relevant verses of the Qur'an with system reproduction human student capable analyze and connect paragraph This with concept. In terms of This student think analytical and reflective which is part from reasoning critical.

The learning tools developed include teaching modules, student worksheets (LKPD), teaching materials, and questions. These tools contain verses from the Quran relevant to the concept of the human reproductive system. They

are also aligned with the Critical reasoning skills (KBK) indicators. The relevance of the learning tools to the KBK and their implementation are outlined in the following table:

No	Learning tools	Integration of the Qur'an	Relevance to KBK
1	Modul ajar	Include verses from the Qur'an that command humans to think and analyze as a motivating activity.	Using a PBL learning model whose syntax is relevant to the KBK indicators. Commands for thinking and analyzing are part of the KBK indicators.
2	Bahan ajar	There is Q.S. Al Isra' verse 30; Q.S. An Nuur verses 30 and 31 about guarding your views towards the opposite sex	There are excerpts from articles that can stimulate students to think critically.
3	LKPD	Students analyze the meaning contained in the verses of the Qur'an that are relevant to solving problems	The questions in the LKPD have been adjusted to all KBK indicators
4	Posttest question	Students analyze the meaning contained in verses of the Qur'an that are relevant to the concept	The questions in the questions have been adjusted to all KBK indicators

The table shows how the implementation of learning tools improves the KBK. This is evident from the presence of Quranic verses relevant to the concept, then students analyze their meaning to solve the problem. The Quranic verses do not explicitly answer the problem, so students need to think and analyze them. Students understand that the verse realistically corresponds to the concept and real life, then can think reflectively to solve the problem. Students are also required to evaluate the cause and effect of human behavior on reproductive health. This ability is part of the KBK indicators. This is in accordance with the theory put forward by Robert Enis (1985) that critical thinking is the ability to think realistically and reflectively. Similar research was also conducted by Mudrikah & Suliyanah (2024) that the integration of the Quran in learning can improve critical reasoning skills.

The integration of the Quran into biology learning has made a positive contribution to the development of biology education, particularly with a focus on values. This learning incorporates religious values as guidelines for behavior, such as preventive measures against the impacts of promiscuity. These religious values serve as a foundation for understanding the phenomena around students, not just understanding the meaning of a verse but also fostering good behavior. Thus, students develop positive

character traits such as gratitude and an awareness of reproductive health.

Opinion the stated by Nasution (2020) who stated that religious values can increase understanding and thinking critical student ([Nasution, 2020](#)). This matter prove that existence intervention in the form of integration of the Qur'an is capable increase element critical reasoning skills student.

4. CONCLUSION

Device Learning biology integrated Al-Quran in System Material Reproduction Human stated Enough effective used in learning for increase profile students Pancasila. Device Learning biology integrated the Qur'an in study This only encompassing in One material system reproduction human. In the Qur'an there are Lots relevant verses with various draft material learning that can reviewed in eye another lesson. This is open opportunity for other researchers to more explore verses of the Qur'an and integrating them in learning.

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