



The Correlation Between Concept Mastery and Students Moral Reasoning Stage Through Socio Scientific Issue Approach on Human Reproduction System Material

Eva Sujati¹, Baiq Sri Handayani^{1*}, I Wayan Merta¹, Tri Ayu Lestari¹, I Putu Artayasa¹

¹Study Program of Biology Education, Faculty of Teacher Training and Educational Science, Mataram University, Indonesia

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Abstract: The aim of this study was to obtain empirical data regarding the relationship between the mastery of concept, and the stage of students' moral reasoning. The research method used was correlational research with cluster random sampling technique. The population in this study were all senior high schools in the city of Mataram and the sample consisted of 171 class XII students from three public senior high schools in the city of Mataram. Data collection was carried out using a concept mastery test instrument in the form of multiple choice questions and a moral reasoning stage test using a questionnaire on socio-scientific issues. The results of the research as a whole, it consisted of (1) Test of mastery of the material concept of the reproductive system of students in the less category with a percentage of 45%. (2) The moral reasoning test of students was categorized into the category of beginner reasoning stage with a percentage of 56% (3) The correlation test on concept mastery and moral reasoning stage used Spearman correlation and it showed that there was a significant relationship ($r = 0.835, p = 0.000$) with positive direction. This positive and significant relationship can be interpreted that the higher the mastery of the material concepts of the reproductive system of students, the better the stage of students' moral reasoning.

Keywords: Mastery of concepts; stage of moral reasoning; approach to socio-scientific issues.

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Introduction

The development of science and technology is something that cannot be avoided by humans in life, one of which is in the field of SCIENCE. New discoveries such as in molecular biology and biotechnology are related to the development of science and technology in the reproductive system to produce new individuals, for example, the discovery of in vitro fertilization or IVF, cloning, gene mapping, and gene transplantation. Every innovation created to provide

positive benefits for human life, for example the use of IVF technology for couples who are difficult to get offspring. However, technological developments also have a negative impact, namely related to changes in human civilization, both related to shifts in human values and related to various ideational impacts (Peniati et al, 2017). The development of science and technology directly or indirectly has an impact on the erosion of human moral values which is very worrying. A person can behave badly due to the use of technology that is not used properly. The spread of

Email: Bqsrihandayani23@gmail.com (*Corresponding Author)

moral issues among teenagers such as drug use, pornography, rape, and abortion has become a social problem that often occurs. Such conditions are very public, especially parents and teachers (educators) due to the perpetrators and their victims are mostly teenagers, especially students and students (Wulandari et al, 2017).

Senior high school students are teenagers who are relatively still very aware to environmental changes. Adolescence is a period or period of maturation of the human reproductive organs, namely between the ages of 10-19 years. Adolescence is characterized by a number of characteristics, namely starting to clearly feel an increase in sex drive in him as a result of hormonal changes, for example, there is an attraction to the opposite sex and a desire for sexual satisfaction. If this condition cannot be controlled, it will have a negative impact that causes the teenager to have free sex, premarital sex, and rape that leads to pregnancy. Unwanted pregnancies will end in the act of disposing of the baby and even abortion or abortion (Hidayat, 2013). According to the results of a survey (BKKBN) (2014) the abortion rate in Indonesia is quite high, reaching 2.4 million per year, an increase of about 15% every year, of which 800,000 are carried out by young women who are still students. Lon (2020) cited WHO (2013) estimates that more than 200 million pregnancies per year and 38% of them are unwanted pregnancies. Two-thirds of unwanted pregnancies, about 50-58 million, and it encourages the abortion. Accurate data on abortion is very difficult to be obtained because abortion is done secretly. Abortion is not merely hidden, generally teenagers, students and unmarried students tend to hide their pregnancy. The perpetrators kept this a secret because they did not want other parties, especially parents and the school, to know that they were pregnant.

Prevention of unwanted pregnancy (KTD) is very necessary, especially for young women because it can have a negative impact on the adolescents. In accordance with the counseling data from the PKBI West Nusa Tenggara in 2010, it was found that 652 teenagers asked for information about sexuality, 24 teenagers experienced unwanted pregnancies, 54 cases of child victims of abortion, 137 people suffered from HIV and 83 people suffered from AIDS, and 137 teenagers are infected with the disease. sexually transmitted. Based on data released by the Central Lombok Health Office, as of 2017, there were 176 people living with HIV/AIDS, and 134 AIDS sufferers. Dealing with the number, 42 people died due to the malignancy of HIV/AIDS (Paezal, 2020).

Knowledge is one of the factors that can form the stage of moral reasoning. Moral reasoning is defined as the way a person thinks to arrive at a decision that

something is considered good or bad. The importance of knowledge about moral reasoning and mastery of concepts about biological material that has been studied, especially material on the reproductive system should be able to provide a strong basis for the development of students' assessment of situations that are good or bad for themselves. A good understanding of the concept of reproductive system material is very important, because curiosity about sex in adolescence is very large. Many people still consider it taboo to talk about sexual issues in everyday life. Such conditions cause teenagers to seek information about sex from the internet, books, movies or in the form of pictures secretly. In this case, the position of moral education and its integration in biology learning is an aspect that needs to be developed (Lestari, 2017).

The human reproductive system is one of the subjects in Biology and it requires a deep understanding of concepts because it is very closely related to everyday life. Education about free sex and abortion is also related to biology subjects, specifically in the chapter on the Reproductive System. Understanding the concept of the reproductive system in students is quite influential on learning outcomes, due to the reproductive system is one of the interesting topics for students but if students misunderstand the purpose of learning on the subject, it will emerged the bad impact. In the Reproductive System learning process, students are expected to be able to understand the physical meaning of the concepts being studied and be able to solve problems related to the material in everyday life (Pratama, 2021).

Seeing the condition of many moral deviations among teenagers today, it is the task that carried out by educators to develop moral learning strategies that need to be pursued properly. Moral education is teaching about morals. Moral education teaches students about which values are good and bad. Moral education can be done using a moral reasoning approach that emphasizes the reasons why an action is taken. If the values possessed have been internalized in students, it will form the good character in students. People who have good morals, they can automatically view something from their moral reasoning, whether their behavior has a good impact or not. Youth morality is important to study and develop, because it will determine their fate and future as well as the survival of the Indonesian nation in general (Rachmawati, 2011).

Socio-scientific issues are issues that involve the use of scientific topics both conceptually and procedurally which require students to be involved in problems by using moral reasoning to solve them. Socioscientific issues focus on social issues that involve a moral or ethical component with scientific relevance. Socio-scientific issues have a conceptual relationship

with scientific knowledge, but also require individual moral considerations to solve problems (Sismawarni, 2020). Based on the research that has been stated previously, then conduct research on the mastery of concepts and moral reasoning of students with the title research "the correlation between concept mastery and moral reasoning stage of state senior high school students in mataram city through socio scientific issue approach on human reproduction system material".

Method

This study was a descriptive correlational research. The population in this study were all senior high schools in the city of Mataram. The samples taken from this study were students of class XII MIPA from SMAN 1 Mataram, SMAN 7 Mataram, SMAN 10 with a total of 171 students who were carried out with cluster random sampling technique. The data was collected by giving a test using an instrument in the form of a concept mastery test of 10 multiple choice questions. The moral reasoning stage consisted of 2 categories which measured by a questionnaire consisting of 4 questions on socio-scientific issues and those were adapted based on the indicators proposed by Jones et al. (2007). Data analysis was carried out using quantitative descriptive analysis with the help of the SPSS 26 for windows program to examine the possibility of a relationship between the variables of mastery of the reproductive system material concept and the moral reasoning stage of students. The writing format used to explain the relationship between the two variables was descriptive writing. Prior to the above test, a prerequisite test or classical assumption test was undertaken in which included tests for normality and linearity of the data. The normality test used the Kolmogrov Smirnov One-Sample test and the linearity test used the test for linearity.

Result and Discussion

Mastery of the material concept on the human reproductive system for senior high school students in the city of Mataram

Responding to Figure 1, the results of the test of mastery of the reproductive system material concepts of students covering five categories show a very good percentage of 5%, good at 15%, sufficient at 22%, less at 45%, and very less at 13%. Lack of mastery of student's concepts can be caused by the occurrence of misconceptions and difficulties in recalling the knowledge that has been previously obtained due to the wide range of material on the human reproductive system.

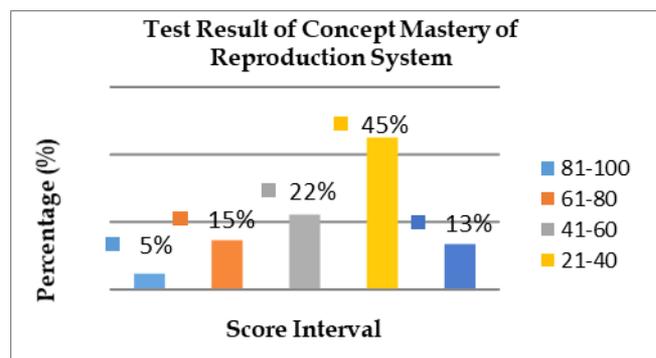


Figure 1. Bar chart of the frequency distribution of the test results of the mastery of reproductive system material concept.

Interest in a lesson or a material affects the motivation of students in learning so that it can affect the level of mastery of the concept of a material. This opinion is supported by Hamalik (2002) various factors that can cause learning difficulties including interest in learning and learning styles. Each student has a different personality and interest in learning. High interest will increase motivation, while lack of interest causes lack of attention and effort in learning. Besides the interest, learning styles can also be a factor in learning difficulties for students. In addition, student learning difficulties are also caused by the weakness of the method used. For young students and teenagers, their rational thinking ability is still limited. This is due to their young age requires maturity in rational thinking about a concept or theory. Another possibility is that the learning design applied by the teacher at the school is less attractive to students, so students are less interested in deepening their knowledge to applicable issues.

The results of this study are in line with the results of research conducted by Rustaman (2006), mastery of Biology concepts for Indonesian students is still low because students are only able to remember scientific knowledge based on simple facts. Most students only memorize concepts and are less able to think deeply to relate what they have learned to its application in new situations. This is supported by the opinion of Setyadi (2012) which asserts that one of the factors that causes the level of mastery of concepts to be included in the low and high criteria because in the minds of students there are concepts based on previous knowledge. It is also in line with Hermawati (2012) who points out that the knowledge gained by receiving, remembering and memorizing will not be long embedded in students' memories, resulting in a lack of students' ability to understand the concept of a material. This is related to student retention (memory) which is a component of learning. Retention is what is left behind and can be recalled after someone learns

something. With retention, it encourages the individual left behind in learning of cognitive structure and can be recalled when it is needed.

A similar research is also conducted by Maesyarah (2015) that the lack of mastery of students' concepts also have occurred in junior high school students throughout the city of Sumbawa Besar and it is also related to the lack of students' ability to process information and the lack of students' level of reasoning. This is supported by the opinion of Ma'rifah (2012) which argues that students who ignore the information obtained or store it in short-term memory will not be able to store concepts permanently. In addition, the low level of reasoning causes students to be unable to think deductive, proportional, combinatorial, and reflexive hypotheses so that knowledge cannot be understood properly.

The stage of moral reasoning for senior high school students in the city of Mataram

Based on Figure 2, the frequency of the results of the moral reasoning test shows the criteria for the beginner reasoning stage with a percentage of 56% and the criteria for the advanced reasoning stage with a percentage of 44%. These results indicate that the level of moral reasoning of public senior high school students in the city of Mataram is classified as low with a position in the beginner stage and some in the advanced stage.

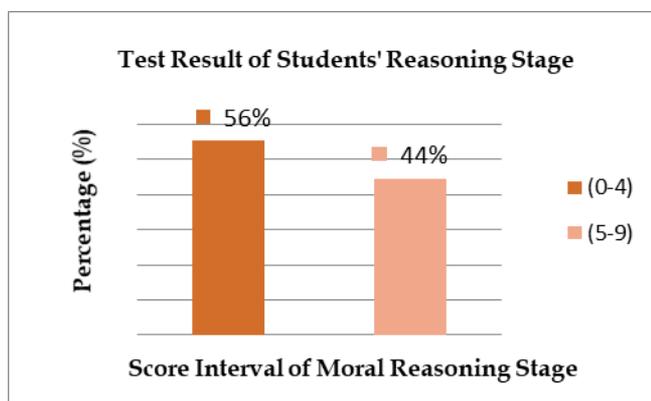


Figure 2. Frequency distribution of students' moral reasoning stage test scores

This illustrates that students with the beginner reasoning stage, they have not fully or are still hesitant in placing themselves in the position of others, have not been able to fully consider various reasons in making moral decisions, students tend not to associate the arguments put forward with knowledge, have not been able to choose or consider actions. as what should be done in order to make the perpetrator realize his mistake and change his behavior. In the advanced stage, in making moral decisions, students will

experience dilemmas based on elements of the interests of the general public and the wider community, the long-term and short-term impacts that may occur from the existence of moral issues, and the arguments put forward using knowledge both in the biological, social and environmental fields. , culture, and religion. Dealing with these results, it shows that most of the students belong to the beginner reasoning stage. It has been emphasized by Peaget (in Laras, 2019) Moral reasoning developed from a heteronomous (low) moral reasoning movement to autonomous (high) moral reasoning. Individuals with autonomous moral reasoning are characterized by being able to put themselves in the position of others or take over roles and are able to see actions from other perspectives that are different from their own perspectives, so that adolescents will make judgments on the basis of subjective responsibility. In contrast to the stage of heteronomous moral reasoning which assess the good or bad of a behavior by looking at the consequences that will occur.

The ability of good moral reasoning will encourage individuals have ability to consider everything related to morals, able to take into consideration which actions are good and which are bad in accordance with the norms that they hold personally and in accordance with those in their community. It is in line with that (Joanne, 2014) states that moral reasoning is very important to have, as one of the cognitive abilities that are useful for life related to dealing with situations that contain moral dilemmas.

People who have high moral reasoning, they will consider the possible consequences of moral issues in the future, both for themselves and those around them. The good and bad considerations of the moral issues that occur are in accordance with what argued by Rachmawati (2011), which states that attitudes are formed from three components, namely cognitive, affective and conative. Moral reasoning is defined as one of the factors in terms of cognitive components that affect the formation of individual attitudes in making decisions.

According to Budiningsih (2004) factors that can influence the development of a the individual's moral reasoning include: (1) Social environment (2) cognitive development, (3) education, (4) empathy and (5) cognitive conflict. In addition, other factors that influence moral reasoning include parenting patterns, schools, interactions with peers and culture. Abdolmohammadi's research (2002) found that individuals who have a high level of moral reasoning when faced with situations that cause moral dilemmas are individuals who can decide which actions to take responsibly. This is in line with Horstink's research (2012) who shows that people with a higher level of

moral reasoning will think about the possible impact of moral issues in the future, both for themselves and the people around them.

The relationship between mastery of the material concept of the human reproductive system and the stage of moral reasoning of senior high school students in the city of Mataram

Dealing with the results of the correlation test in table 1.1, it reveals that there is a relationship between the variable data mastery of the reproductive system material concept and the student's moral reasoning stage variable, a significance value (Sig.) of 0.00 is obtained. Because the significance value is smaller than $\alpha = 0.05$ ($0.00 < 0.05$), it can be revealed that there is a relationship between the variable mastery of the reproductive system material concept and the student's moral reasoning stage variable. From the research results obtained correlation coefficient value of 0.835 which indicates the form of a positive relationship with the degree of relationship that is very high correlation.

Table 1. Test Table of Correlation.

Correlation	Significance Value	Correlation Coefficient	N
Concept Mastery and Students' moral reasoning stage	0,000	0,835	171

This positive and significant relationship can be interpreted that the higher the mastery of the material concepts of the student's reproductive system so then better the stage of students' moral reasoning. This is in accordance with the opinion of Hurlock (2011) who argues that there is a relationship between knowledge and moral reasoning, he asserts that existing knowledge to solve problems is indeed needed in certain behaviors, namely to see the difference between right and wrong and to know the consequences of an action. It is further explained that knowledge is used to understand what can be done and what cannot be done, then through the ability of intelligence a person will be able to understand the consequences that will occur after an action. This research is in line with Lestari's research (2017) with the title Analysis of the Relationship Between Concept Mastery, Consistency of Moral Arguments, and the Stage of Moral Reasoning of High School Students Using Socio-Scientific Issues in Reproductive System Materials, from the results of his research obtained a significant relationship between concept mastery and reasoning stage students' morale where ($r = 0.546$, $p = 0.000$). Thus, there is an indication

that the higher the mastery of concepts, the better the stages of students' moral reasoning. So that the hypothesis which reads "There is a relationship between concept mastery and the students' moral reasoning stage" can be accepted.

It is also similar with the research has been conducted by Murti (2019) with the title of Relevance of Learning Achievement as a Predictor of Moral Reasoning. The results of the research that have been obtained indicate that student achievement has a significant effect on moral reasoning. Knowledge is one of the factors that can form the stage of moral reasoning. Learning achievement does not only describe intellectual abilities but also moral abilities. Jr. Bullough (2011) reveals that knowledge is not only targeted for cognitive achievement but also moral achievement. If the goal of science is to form students into scientifically educated citizens, then there is a need for biology learning that trains moral reasoning by using socioscientific case dilemmas. This is in accordance with Lancu's (2014) opinion that moral law must be intertwined with biological law, considering that the context of modern biology teaching must be in accordance with the needs of moral education and be responsible for the future of humanity

The socio-scientific issue approach can improve students' moral reasoning, where socio-scientific issues focus on social issues involving moral or ethical components with scientific relevance, where students are required to be able to analyze a scientific and social issue in terms of science and the views of ordinary people. Sensitivity to the social environment gives rise to individual social actions that reflect attitudes and beliefs of individual towards social objects. Therefore, knowledge, feelings, and actions are aspects that are interrelated with each other to form an attitude, belief, and moral value. Moral is one aspect of life that will affect other aspects of life. Thus, to create moral decisions, the individual must think about the consequences of the attitude to be taken. According to Grasia (2012) the factors that can influence attitudes include: 1) The effect of culture without realizing it, culture has instilled a line of influence on attitudes towards various problems. Culture has been included by the attitudes of members of the community, because it is culture that gives a style of experience to the individuals of the community they care for, 4) The mass media, in reporting on newspapers and radio or other communication media, news that should be factually conveyed objectively tends to be influenced by the attitude of the author, consequently it affects towards consumers, 5) Educational institutions and religious institutions, moral concepts and teachings from educational institutions and religious institutions greatly determine the belief system.

Sarwono (2009) also suggests two factors that can influence the formation of attitudes in acting, namely internal factors and external factors. Internal factors are factors contained within the person concerned, such as choice factors. We cannot perceive external stimuli through our perception, therefore we must choose which stimuli to approach and which to avoid. External factors, namely: Authority, the character of a person or group that supports this attitude, the communication media used in conveying attitudes, in the current technological era the use of multimedia is very more effective than only using traditional media, especially if only by word of mouth and the situation in which attitudes are formed.

Based on several theories and research results that have been presented regarding mastery of concepts and moral reasoning, it is very necessary to involve moral learning using reasoning in biology, especially in the material of the reproductive system. The goal is that adolescents can reach the stage of moral reasoning optimally in accordance with their development, so that adolescents will be more careful in their actions. Good moral reasoning can suppress the occurrence of moral violations, especially those related to the health of the adolescent reproductive system.

Conclusion

Based on the discussion of the results of research that has been carried out in three public senior high schools in Mataram City, it can be found: (1) The percentage of students' mastery of reproductive system material concepts at Public Senior High School in Mataram City at the class XII MIPA from SMAN 1 Mataram, SMAN 7 Mataram, and SMAN 10 Mataram which included five categories, it showed very good at 5%, good at 15%, moderate at 22 %, less by 45%, and very less by 13%; (2) The moral reasoning of SMAN students in the city of Mataram was low with the majority of the beginner stage and some at the advanced stage. In the advanced stage, in making moral decisions, the subject will experience a dilemma based on elements of the interests of the general public and the wider community, the long-term and short-term impacts that may occur from the existence of moral issues, and the arguments put forward using knowledge in the fields of biology, social, and economics. culture, and religion, whereas the beginner stage of reasoning was the opposite; (3) The relationship between concept mastery and the stage of moral reasoning of senior high school students in class XII indicated a significant relationship, namely 0.00 (enough category) with a positive direction. This

positive and significant relationship can be interpreted that the higher the mastery of the material concepts of the reproductive system of students, the better the stage of students' moral reasoning.

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