

Scientific attitude analysis on students in class XI natural science regarding human blood circulation system material

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| Article Information | Abstract |
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| <p>Keyword: Scientific attitude; Biology student; Human circulatory system; High school student; Learning activity</p> <p>Kata Kunci: Sikap ilmiah; Peserta didik biologi; Sistem peredaran darah manusia; Peserta didik SMA; Aktivitas belajar</p> | <p>Attitude is a tendency to behave and may be viewed as an individual's response to a stimulus. Although attitudes toward biology, particularly the human circulatory system, can be represented by the acceptance or rejection of certain biological objects. This research aims to determine high school students' attitudes at SMA Negeri 2 Bilah Hulu towards biology subjects, particularly the material on the human circulatory system. This research employed a qualitative strategy and descriptive approaches. The findings of this survey indicate that the indicator of pleasure in studying biology is 78.30%, the indication of curiosity is 82.92%, the indicator of interest in extending biology time is 80.90%, and the indicator of interest in a career in biology is 79.89%. This research concludes that students have the highest positive attitude toward the indicator of curiosity, while they have the least positive attitude toward the indicator of enjoyment in learning biology. Good curiosity from students is a good foundation in the learning process; it's just that innovative learning activities that are more interactive are needed if you want students to be more interested in learning biology.</p> |
| <p>History: Received : 05/12/2022 Accepted : 11/02/2023</p> | <p>Abstrak</p> <p>Sikap ialah kecenderungan dalam berperilaku dan dapat diartikan sebagai ungkapan seseorang terhadap suatu stimulus. Sedangkan sikap terhadap biologi khususnya mata pelajaran sistem peredaran darah manusia dapat diungkapkan melalui perasaan/perilaku menerima atau menolak terhadap objek biologi tersebut. Adapun tujuan dari penelitian ini yaitu untuk mengetahui sikap peserta didik terhadap mata pelajaran biologi khususnya pada materi sistem peredaran darah manusia pada tingkatan sekolah menengah atas lebih tepatnya di SMA Negeri 2 Bilah Hulu. Penelitian ini menggunakan pendekatan kualitatif dengan menggunakan metode deskriptif. Hasil dari penelitian ini yaitu pada indikator kesenangan dalam belajar biologi dengan persentase sebesar 78.30%, indikator rasa ingin tahu dengan persentase sebesar 82.92%, kemudian pada indikator ketertarikan memperbanyak waktu biologi dengan persentase sebesar 80.90%, dan pada indikator ketertarikan berkarir dibidang biologi dengan persentase sebesar 79.89%. Adapun kesimpulan dari penelitian ini yaitu bahwa sikap positif peserta didik paling banyak pada indikator rasa ingin tahu, sedangkan sikap positif peserta didik paling rendah ada pada indikator kesenangan dalam belajar biologi. Rasa ingin tahu yang baik dari peserta didik adalah pondasi yang bagus dalam proses pembelajaran, hanya saja diperlukan inovasi kegiatan belajar yang lebih interaktif jika ingin peserta didik menjadi lebih tertarik untuk belajar biologi.</p> |

A. Introduction

Education is one of the true learning processes, and education aims to foster cognitive thinking and self-control, including attitude (Manasikana & Anggraeni, 2018). Consequently, education may be understood as enhancing a person's conduct or attitude to make them a better person. According to (Putra & Wiza, 2019), education is an activity that plays a very important role; this is because, with education, all humans can change their behaviour and knowledge for the better. So that education can be an integral part of every individual in every nation. Moreover, according to (Kurniawan et al., 2019), education can be interpreted as an activity that plays a very important role for every human being, which can change behaviour (traits) and knowledge to become even better. Furthermore, education in the present requires the use of technology and human resources to a great extent. Because we live in the era of industrial revolution 4.0, education may improve human behaviour and knowledge.

The Indonesian school system has three stages of formal education: elementary, junior high, and senior high school. These three levels of education must be completed before moving on to a higher level (Haqiqi, 2022). This educational potential may be realized through educational institutions, one of which is high school (SMA) (Putra & Wiza, 2019). At this level, students are expected to have self-control in order to think rationally. Thus, Biology is one of the disciplines that may help students expand their thoughts. Essentially, biology studies everything relating to living beings and their lives (Amin, 2016).

Students' scientific attitudes may be determined by their level of interest and their ability to comprehend a new subject by demonstrating its integrity, in addition to being able to evaluate performance independently. This can assist a student in acquiring scientific, systematic, and autonomous knowledge.

A scientific mindset is essential for learning since it may encourage the teaching and learning process (Supeno et al., 2017; Pratiwi et al., 2019). There is how a student should behave in the teaching and learning process, respond to a problem, complete a task, and develop a scientific attitude (Latipah et al., 2020; Purwanto et al., 2021). These have a favourable effect on student learning results (Isnaeni et al., 2021; Parmiti et al., 2021). Students can learn to comprehend scientific views by establishing a scientific attitude during the teaching and learning process. The scientific mindset requires honesty, conscientiousness, accountability, discipline, and curiosity.

In the teaching and learning process, attitudes function as "dynamic forces" or can be interpreted as forces that will move all individuals to learn (Kurniawan et al., 2019). Attitude is a tendency to behave and can be interpreted as a person's expression of a stimulus (Sari et al., 2022). While attitudes towards biology, especially subjects of the human circulatory system, can be expressed through behaviour of accepting or rejecting these biological as scientific objects. According to Rijal & Bachtiar (2015); Juhji & Nuangchalem (2020), attitudes towards biology are considered important because attitudes can improve students' educational achievements and influence student performance on these biological objects.

Attitude is one of the factors that can influence the aim of learning achievement. Attitude is a behaviour pattern people have, such as feelings or responses towards a person, object or problem (Kurniawan et al., 2019). The positive attitude of students toward biology subjects, particularly the material on the human circulatory system, can be observed when a student demonstrates curiosity during the teaching and learning process, as well as when the student appears eager to ask and answer questions posed by the teacher, particularly during group discussions in class (Sukmarita, 2018).

The positive attitude of students is exemplified by the fact that there is productive contact between students and teachers during the teaching and learning process. Students' positive attitudes toward science might be observed if they are receptive and passionate about science subjects conducted outside the classroom. Inversely, students with a poor attitude about biology subjects will behave negatively toward the biology teacher (Novelyya, 2019). A student's positive attitude toward biology will be combined with the social value of biology, scientific attitudes, enjoyment of learning biology, curiosity, desire to spend more time studying biology, and ambition to pursue a Career interest in biology. Its social implications describe the ramifications of biology on social life. It might manifest as attitudes toward societal advantages and issues in scientific research and technological advancement.

Curiosity for learning is demonstrated by students' enjoyment of biology study, characterized by a strong desire to learn. If students have a positive outlook towards using problem-solving skills in biology, they will find the subject palatable. According to (Putra & Wiza, 2019), students would find joy in studying biology if they could design and implement techniques or solutions to questions through teaching methods. Aside from teaching

methods, the classroom is the component that makes students feel pleased while learning. Biology will be more enjoyable for students if their classrooms are relaxed. In addition, the setup of a pleasant classroom can increase students' concentration and curiosity for the teaching and learning process.

The existence of an interest in expanding the time to study biology can be read as a student's preference for studying biology so that students have ample time to study biology in depth. Students will be motivated to do experiments at home, in the library, or review biology-related books and articles to expand their knowledge.

Students are able to remember and master the subject matter by repeating lessons that have been presented by the teacher and practising questions individually or in small groups during additional study time. "Study time refers to a certain period of time a student sets aside to acquire information via studying" (Ukpong & George, 2013). Not only must the instructor who teaches support the expansion of study time, but they must also advocate for it. It is necessary to supplement a teacher's efforts with additional activities designed to improve the quality of lessons and raise students' capacity to comprehend what they have learnt. This is due to the fact that students will spend more time studying biology daily, making them more focused and able to grasp subjects. Time spent studying biology will positively affect a student's quality and learning results.

If a student already has an optimistic perspective and is interested in devoting more time to biological studies, the above explanation suggests they should spend more time on these topics. Hence, students will calm down and resume their biology studies. This passion is separate from a student's conviction that a Career interest in biology is in his future plans. So, students' attitudes toward biology studies might be enhanced by their desire to pursue a Career interest in the field (Bang, E, & Baker, 2013). "Male students pick science-related job pathways and scientific activities more frequently than female students on a constant basis. Implementation of the curriculum, the availability of technology employed by instructors in the teaching and learning process, and the often changing surroundings of students may contribute to the creation of unfavourable attitudes among students about biological courses.

If students are exposed to excessive scientific material, they will develop a more pessimistic attitude. Hence, the learning environment should be created so students may acquire scientific

information and develop a more favourable attitude toward science (Hacieminoglu, 2016). The problem will worsen due to a teacher's lack of knowledge regarding students' unfavourable attitudes toward biological courses.

This study aims to determine the attitudes of high school students at SMA Negeri 2 Bilah Hulu towards biology disciplines, particularly the content on the human circulatory system. Indicators of this attitude are the enjoyment of studying biology and a desire to devote more time to biology courses.

The results of this study are anticipated to provide knowledge or insight regarding students' attitudes toward biology subjects, particularly material for the human circulatory system, and can contribute to future research. The benefits for teachers and schools are anticipated to provide comprehension and can improve students' attitudes towards studying biology objects.

Based on the background above, the authors are interested in conducting a study entitled Scientific Attitude Analysis on Students in Class XI-IPA at SMA Negeri 2 Bilah Hulu Regarding Human Blood Circulation System Material.

B. Material and Method

This research employed a qualitative strategy and descriptive methodology. The qualitative method is a postpositivist research approach used to assess the condition of natural things, with the researcher serving as the primary instrument. This research makes use of a field survey methodology. The survey approach is a research method that tries to analyze a broad population using the sampling method to discover the population's behaviour, traits, and provide descriptive and generalizations.

Total sampling is a strategy in which the number of samples equals the population size (Sugiyono, 2017). The reason for using the total sampling method is because, according to Sugiyono (2017), if the population is less than 100, the entire population is used as the research sample. The population of this study is all students of class XI IPA at SMA Negeri 2 Bilah Hulu, which consists of 2 classes, namely XI IPA-1, totalling 35 people. At the same time, XI IPA-2 is 32 people, so the total population is 67.

This research employed data triangulation techniques for data collecting. According to (Alfansyur & Mariyani, 2020), data triangulation is a data gathering method that integrates many data collection methods and current sources. Students from class IX IPA at SMA Negeri 2 Bileri Hulu were administered a questionnaire to collect data for this study. The questionnaire consists of 30 attitude

questions, divided into two categories: positive statements comprising 15 items and negative statements totalling 15 items. The purpose of the questionnaire is to analyze students' attitudes about the topic of the human circulatory system. This study used a Likert scale with five rating scales: SS (strongly agree), S (agree), R (doubtful), TS (disagree), and STS (strongly disagree) (strongly disagree). Components of the questionnaire include the respondent's name and a statement consisting of 30 statement items to assess student perceptions towards the human circulatory system. The acquired data from the questionnaire will be evaluated using Microsoft Excel and then reported. Then the data collected from the questionnaire will be analyzed and then described.

The results of this study are shown by statistics derived from 4 indicators of students' attitudes towards the human circulatory system material, namely:

- 1) Enjoyment in learning biology.
- 2) Curiosity.
- 3) Interest in increasing time for studying biology
- 4) Interest in a career in biology.

C. Results and Discussion

The data is gathered in the form of a questionnaire based on research examining the scientific attitude of class XI IPA students at SMA Negeri 2 Bilah Hulu towards the material of the human circulatory system. The data from the questionnaire consist of replies provided by respondents to the questionnaire, which were delivered directly by

students in class XI IPA from SMA Negeri 2 Bileri Hulu. There are as many as 67 students in total. In the questionnaire, four indicators were provided, which were then reduced to thirty statements that were anticipated to describe students' scientific attitudes towards the material of the human circulatory system. The results of a study on students' scientific attitudes concerning the material of the human circulatory system are provided in Table 1. The results show that the indicator of pleasure in studying biology a percentage of 78.30%, the indicator of curiosity a percentage of 82.92%, then the indicator of interest in increasing biology time a percentage of 80.90%, and the indicator of interest in a career in biology with a percentage of 79.89%.

Attitude is frequently related to an individual's self, which is stable and hard to alter (Kurniawan et al., 2019). Each individual has unique characteristics, resulting in frequently different attitudes. Attitude is frequently cited as one of the most crucial aspects of the teaching and learning process. One of the primary purposes of studying biology, particularly the information on the circulatory system, is to teach students how to be directly involved in scientific research to integrate their abilities, knowledge, and attitudes to acquire better scientific understanding notions. Students on the circulatory system content are highly beneficial for determining if students have a favourable or negative scientific attitude toward the circulatory system information. Following is a description of the four indicators:

Table 1 Student attitude questionnaire data on human circulatory system material

| No | Indicator | % |
|----|---|-------|
| 1 | Enjoyment in Learning Biology | 78,30 |
| 2 | Curiosity | 82,92 |
| 3 | Interest in Increasing Biology Study Time | 80,94 |
| 4 | Career Interest in Biology | 79,89 |

1. Enjoyment in Learning Biology

Students' enjoyment of learning biology is an emotional expression linked to their motivation and willingness to comprehend the lesson (Kurniawan et al., 2019). Instilling a happy attitude in learning biology is very important in studying biology. This indicator shows that the assessment of attitudes toward fun in learning biology is in the "Good" category with a percentage of 78.30%, so it can be concluded that in the indicator of pleasure in learning biology, students feel happy in carrying out biology learning the expression of these students' attitudes can be influenced by the interests possessed by the student. Therefore, it is important to develop students' enjoyment of

learning biology. According to Irwandi & Fajeriadi (2019); Asmaniyah (2022), the enjoyment of learning biology can trigger and maintain an important affective component of students.

2. Curiosity

With a value of 82.92%, this indicator indicates those students' opinions regarding the information on the human circulatory system fall into the "very good" category. Curiosity in the teaching and learning process can be seen as a student's intense desire to learn something new (Kurniawan et al., 2019). According to the questionnaire results, students prefer to ask the teacher if they do not understand a lesson, particularly regarding the

human circulatory system. Students are also pleased when listening to the teacher's explanation of the circulatory system material, and they are proud if they can complete the biology unit.

3. Interest in Increasing Biology Study Time

The indicator of interest in expanding the time spent studying biology falls into the "very good" category with 80.98%. The students' desire to expand their study time at home, as well as their interest in increasing their biology study time at

school, reflect a positive attitude on the part of the students concerning this indication. Students' desire to expand their biology study time is a crucial aspect of the learning process, since when a student is interested in increasing his study time, he is highly motivated to learn. Their hobbies impact the student's attitude. Thus, it is crucial to cultivate pupils' interest in biology. Students' emotional components in the biology learning process are triggered and sustained by their interest in the subject (Kurniawan et al., 2019).

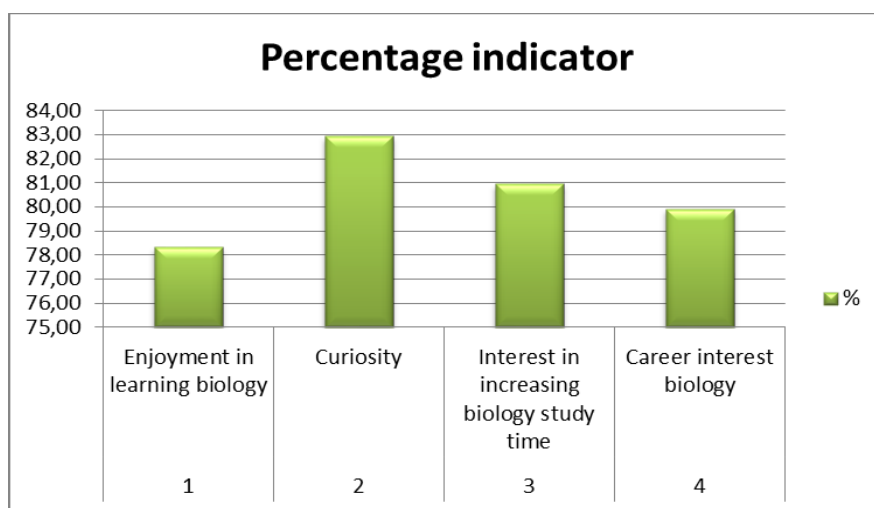


Figure 1 Diagram of Students' Attitudes towards Human Circulatory System Material

4. Career Interest in Biology

Interest in a career in biology is a student's interest in the future. They are interested in choosing a job or continuing their biology career (Astalini et al., 2019). Interest in learning biology can maintain an affective component of pleasure in harmony between cognitive integration and increased experience in learning biology. Experience in learning biology is a factor in students having the motivation or encouragement to pursue a career or deepen their career in biology. Students who have an interest in biology have a significant influence on the growth of students' attitudes towards biology. This indicator shows the "Good" category with a value of 79.89%. The good category indicates that some students feel comfortable or happy in the biology learning process but have doubts about their future in the biology field. Based on the research that has been done, some students do not want to have a career in biology because learning biology is a tough lesson to learn.

Students have a high curiosity in the teaching and learning process, as evidenced by the large number of students who choose to ask the teacher about the material of the human circulatory system that they do not know. Furthermore, students are highly curious to find out for themselves about the

material of the circulatory system that they do not know.

According to Putra & Wiza (2019), the curiosity indicator shows a sufficient category based on analysing students' attitudes towards physics lessons at Ferdy High School. While according to Habayahan et al. (2021), students' learning attitude at the SMA level in Barus District obtained an average value of 61.16% in the sufficient category. And finally, according to (Kurniawan et al., 2019), the curiosity indicator shows a pretty good category with a positive trend with a value of 41.8%.

The results of the research findings state that of the four indicators that have been examined. It is found that the four indicators are in the "good" category. This will have a positive impact on students and also their learning environment. However, even though the findings have shown a good category, students, teachers and education stakeholders should work together to develop further students' interest in learning biology to gain better mastery and knowledge. According to Kurniawan et al. (2019), one of the ways that can be used to foster interest and interest in student learning, teachers must be brave to use an innovative learning model.

Overall, good curiosity from students is a good foundation in the learning process; it's just that innovative learning activities that are more interactive are needed if you want students to be more interested in learning biology. Innovation learning activities are useful to prevent students from boredom in learning. Especially in the fields of science including biology, interactive learning is needed so that students can understand material that requires high concentration. Innovative and interactive learning activities can improve students' scientific attitudes, so they need to be followed up at research locations or widely.

D. Conclusion

Students have a good attitude towards the human circulatory system material. Based on the four attitude indicators, the most positive attitudes of students are in the indicator of curiosity, indicating that in the teaching and learning process, students are more eager to ask questions and discover what they do not know, whereas the least positive attitudes of students are in the indicator of pleasure in learning biology, indicating that students do not enjoy learning about the human circulatory system. More interactive learning activities are needed so that students are more enthusiastic about learning biology materials.

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