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THE URGENCY OF DEVELOPING STUDENT'S HABITS OF MIND IN HIGH SCHOOL BIOLOGY LEARNING IN BANDUNG

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ABSTRACT

Habits of mind are one of the dimensions of long-term learning that allows productive actions to occur and can develop positive student character in problem-solving. However, the importance of habits of mind does not align with the habits of mind abilities of students at a high school in Bandung, where these abilities only reached 53%, falling into the low category. Based on this, the researcher aims to analyze the biology learning process conducted by teachers to understand better the factors influencing students' habits of mind. The method used in this research is quantitative descriptive. The sample was chosen using convenience sampling, resulting in 34 samples from 10th-grade students and a biology teacher at one of the state high schools in Bandung. The research results show that the low level of students' habits of mind is because the teacher has not yet implemented strategies to develop students' habits of mind in classroom learning. Differentiated learning, student-centered approaches, reflection activities, and the promotion of independent learning using resources are recommended interventions to improve students' habits of mind.

INTRODUCTION

Education plays a crucial role in determining the quality of a country, so a country's progress depends on its education (Noviyanti *et al*., 2023; Rohmah *et al*., 2023). Education aims to holistically shape an individual's character, abilities, and potential, including intellectual, socio-emotional, and moral aspects (Pradana *et al*., 2020; Sunusi, 2019). Thus, education does not only focus on transferring academic knowledge but also on character building and equipping students with relevant life skills so that they can

make positive contributions to society (Andari *et al*., 2023; Hanipah, 2023; Hartinah *et al*., 2024). In a global context that continues to develop, education plays a vital role in preparing the young generation to face the challenges and opportunities of the future. Therefore, education must be adaptive to the needs of the times and make individuals lifelong learners who continue to develop and innovate.

One of the Indonesian Government's efforts to realize educational goals is to reform the National education system by introducing the Merdeka Curriculum. The Merdeka Curriculum is relevant to National education goals, which focus on the complete development of the individual. The Merdeka Curriculum supports educational goals by allowing schools and teachers to design contextual and student-centered learning (Badan et al., 2024). With a flexible approach, the Merdeka Curriculum allows for better adaptation to individual student needs, accommodating students' various learning styles, interests, and talents for the formation of character by national identity (Bakri *et al*., 2023; Halimah *et al*., 2023). Through the Merdeka Curriculum, it is hoped to increase student motivation and participation in learning activities and encourage the development of 21st-century skills.

The Merdeka Curriculum aims to build students' knowledge and skills and to revive the noble values contained in Pancasila (Rochmat *et al*., 2023; Zaini & Wahib., 2022). In this way, the Pancasila student profile is born as a form of translating the objectives of the Merdeka Curriculum, which becomes a reference for teachers in building students' character and competence by the values of Pancasila as the basis of the State. Badan Standar Kurikulum dan Asesmen Pendidikan (2022) explains that there are six dimensions of the Pancasila student profile, they are faith, devotion to God Almighty, noble character, independence, cooperation, global diversity, critical reasoning, and creativity. By internalizing each of these dimensions, students can become the next generation who are not only academically intelligent but also dignified and able to compete in the global landscape.

The Pancasila student profile is closely related to habits of mind. Habit of mind is one dimension of long-term learning outcomes, divided into three aspects: self-regulation, critical thinking, and creative thinking (Marzano, 1992). Each aspect of the habits of mind has interrelated and complementary indicators that help build individual habits of mind. Critical thinking involves analyzing, evaluating, and identifying information objectively

to make the right decisions (Rahmatina *et al*., 2022; Syam, 2023). Creative thinking invites individuals to think outside conventional boundaries, develop new ideas, and look for innovative solutions that have not been thought of before (Sumartini, 2021). This aspect includes seeing problems from different points of view and establishing unusual connections between different concepts. Meanwhile, self-regulation focuses on individuals' ability to control their emotions, motivation, and behavior to achieve specific goals (Hayat *et al*., 2019). By developing these three aspects, individuals can face challenges more effectively and succeed in various life areas.

According to Costa and Kallick (2008), habits of mind can equip students with the skills needed to be successful in the future in an ever-changing and complex world. As stated by Dwirahayu *et al.* (2017) and Isfiani (2016), habits of mind help students solve problems because habits of mind form intelligent behavior patterns that enable productive actions to occur. Thus, individual success will be determined by their habits of mind. In this case, student success can be seen in the learning context, one of which is biology learning. Students' habits of mind in biology learning are effective for building their biological knowledge. In biology learning, habits of mind refer to students' ability to independently build and use their understanding of biological concepts (Bariroh*et al*., 2024).

Habits of mind in students can be developed through learning (Hayat *et al*., 2019). Instead of making learning something boring, according to Marzano (1992), the key to cultivating habits of mind is to create a fun learning atmosphere. To gain meaningful knowledge, teachers need to organize students' learning methods in a directed, orderly, and effective manner (Isfiani, 2016). This further underlies the idea that the student learning process cannot be separated from how students think when faced with a problem, such as during an assignment or exam. Therefore, the learning process must be directed through practical thinking to achieve meaningful learning outcomes and train students' intelligence. This will equip students to place themselves in various situations by relying on their thinking abilities. This practical learning will foster good habits in daily learning, encourage discipline and productivity, and train students' intelligence. A positive attitude shown during the learning process will be the key to achieving maximum learning outcomes and developing good habits of mind in students.

Creating meaningful learning to develop students' habits of mind is also influenced by a teacher's pedagogical ability to package their learning. Learning strategies that suit students' needs will influence and form good habits of mind for students (Hasibuan, 2019). When teachers use learning strategies that suit students' learning styles, interests, and needs, students will be actively involved in the learning process. When students are actively involved in the learning process, they develop thinking habits that are critical and creative. In addition, active students are often more exposed to diverse feedback from teachers and peers, thereby helping students reflect and refine their thinking. Therefore, teachers need to choose appropriate learning strategies because, in this way, students gain knowledge and develop habits of mind that support lifelong learning.

The results of a preliminary study conducted by researchers on the habits of mind of class X students at a high school in Bandung City showed a percentage of 53% or in the low category. The preliminary study of this research revealed that class X students in high school tend to have less than optimal critical thinking, creative, and self-regulation skills. This can be seen from student activities such as low student effort in completing assignments, less effective problem solving, lack of reflection on the learning process, and several other indicators. Even though the preliminary study results show that several students have habits of mind in the moderate category, researchers want to know whether these students' habits of mind were formed naturally or due to teacher influence. Through these findings, teachers encourage researchers to analyze the biology learning process to understand further the factors that influence students' habits of mind. The novelty of this research lies in exploring various aspects of teacher pedagogy in forming or hindering the development of habits of mind, such as teaching methods, learning culture, and evaluations carried out by teachers. By identifying these factors, researchers hope they can be used as a basis for designing effective interventions to improve students' habits of mind in learning biology.

MATERIALS AND METHODS

The method in this research is descriptive quantitative, which analyzes the biology learning process carried out by teachers in building students' habits of mind. The population in this study are high school students and biology teachers at one of the state

high schools in Bandung City. Sampling is determined using convenience sampling, resulting in 34 samples of class X.A. students and biology teachers at one of the state high schools in Bandung City. Data collection techniques in this research were obtained through learning observations, teacher interviews, and questionnaires distributed to students. The instruments used in observations, interviews, and questionnaires adopted Marzano's (1992) rubric regarding indicators for each aspect of habits of mind: self-regulation, critical thinking, and creative thinking. Expert validators have validated instruments. Two questionnaires were distributed to students. The first was a questionnaire to measure students' habits of mind, which was used during the preliminary study. The second questionnaire concerns students' perceptions of the implementation of learning to develop habits of mind, which is the subject of this research. This questionnaire uses a Likert scale of 1 (Never), 2 (Rare), 3 (Frequently), and 4 (Always). Apart from primary data, this research also uses secondary data sources and document studies in the form of teaching module analysis.

This research is conducted in several stages. The first stage is observing the research focus conducted in February 2024 through interviews with biology teachers regarding students' habits of mind and distributing questionnaires to explore students' habits of mind. The second stage is data collection, which will be conducted in April 2024. Through learning observations, follow-up interviews with teachers, and distributing questionnaires regarding students' perceptions of implementing learning to develop habits of mind. The third stage is data analysis from observations, interviews, student response questionnaires, and the results of document studies. Data triangulation is carried out to confirm the findings obtained regarding teaching or instilling habits of mind in students. The final stage is a discussion of the results of data analysis, which will then be discussed in the research, as well as the habits of mind, critical thinking, creative thinking, and self-regulation.

The data from the student questionnaire results obtained both at the preliminary study stage or during focused observation and at the data collection stage are calculated and then expressed in percentage form. Then, the percentage results are categorized in Table 1.

$$NP = \frac{R}{SM} x100\%$$

Description:
NP = Percentage value achieved
R = Raw score obtained by students
SM = Ideal maximum score of the test

Table 1. Student Habits of Mind Category

No.	Level of Mastery	Category
1	86 – 100 %	Very Good
2	76 – 85 %	Good
3	60 – 75%	Enough
4	55 – 59 %	Less
5	≤54%	Very Less

(Purwanto, 2006)

RESULTS AND DISCUSSION

Self Regulation

Self-regulation is an essential aspect of the concept of habits of mind, which focuses on an individual's ability to manage thoughts, behavior, and reflection effectively (Hodiyanto *et al*., 2020). According to Marzano (1992), self-regulation consists of several indicators, including being aware of one's thoughts, making plans effectively, being aware of and using resources, being sensitive to feedback, and evaluating the effectiveness of actions. The results of the student response questionnaire regarding teacher learning to build students' habits of mind in the self-regulation aspect can be seen in Figure 1. In Figure 1, it can be seen that the low level of student self-regulation as a criterion for habits of mind is influenced by teachers who have not implemented it in classroom learning.

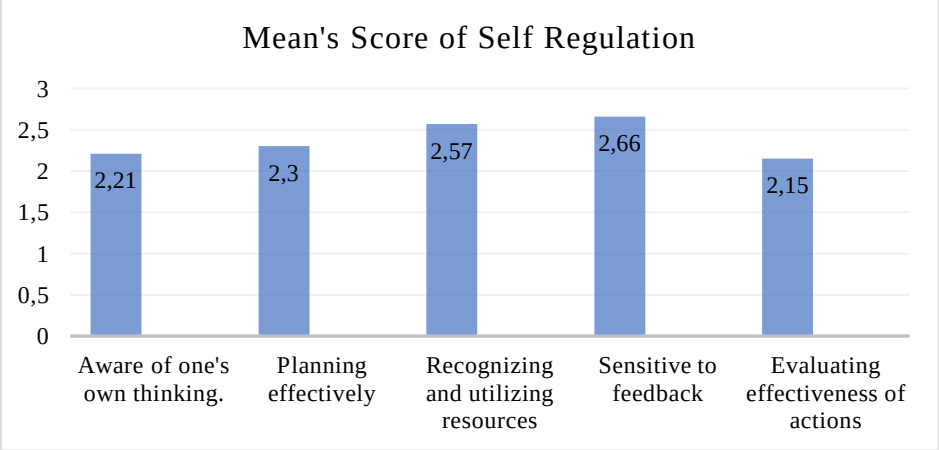

Figure 1. Mean's Score of Self Regulation

In the indicator of being aware of one's thoughts from the results of classroom learning observations, at the orientation stage, the teacher has asked questions that encourage students to reflect on their understanding of the material being studied. The teacher provides opportunities for students to convey their knowledge. However, the teacher has not encouraged students to question their assumptions about the studied material. This makes learning feel more varied and exciting for students. Students tend to receive information rawly without being invited to think critically or explore the concepts being taught more deeply, so this will impact aspects of critical and creative thinking. As stated by Sumartini (2022), teachers who tend to deliver material without questioning students' assumptions will have the impact of losing students' opportunities to develop critical and creative skills.

The results of the questionnaire also support the results of this observation: 69:% of students stated that teachers rarely or never encourage students to learn from mistakes. This attitude can create an atmosphere where mistakes are seen as absolute failures rather than part of the learning process (Dananjaya, 2017). As a result, students feel afraid to try new things or take risks because they are worried about mistakes and negative criticism. Students must be taught to reflect and correct mistakes that inhibit their creativity and curiosity, reducing their motivation to learn independently and exploratively (Maharani & Mahmudah, 2024; Wirnoto & Ratnaningsih, 2022).

Critical Thinking

The critical thinking aspect in habits of mind consists of several indicators, including accuracy and seeking accuracy, clarity and seeking clarity, overt, refraining from impulsiveness, positioning oneself when guaranteed, and sensitivity and awareness of friends's abilities (Marzano, 1992). The results of the student response questionnaire regarding teacher learning to build students' habits of mind in critical thinking can be seen in Figure 2. From Figure 2, we can see that the low level of students' critical thinking is one of the criteria for habits of mind, and it is also influenced by teachers who have not implemented it in the classroom.

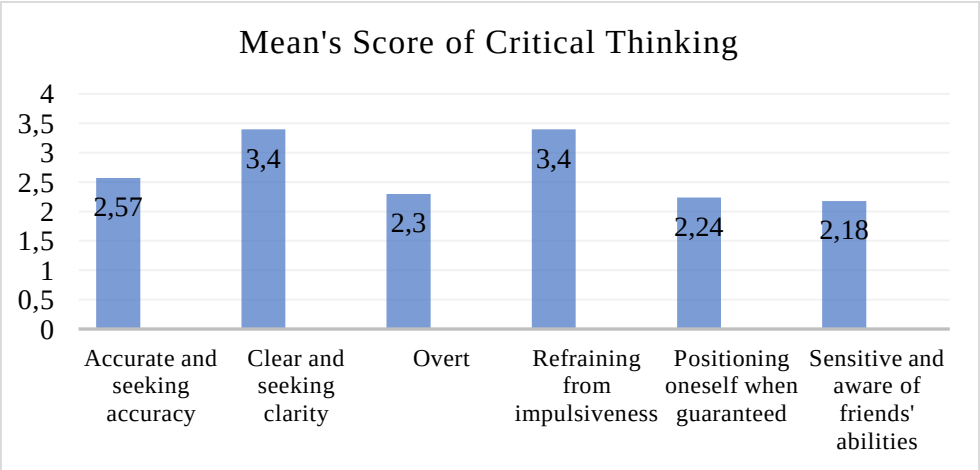

Figure 2. Mean's Score of Critical Thinking

Restrictions on student learning resources impact accurate indicators, and search accuracy is still low (Elfina, 2021). It was proven that when students are limited to resources that the teacher has determined, students need access to enough information to deepen their understanding of a subject. As a result, there is a gap in students' understanding and knowledge. Apart from that, students will tend to do assignments or receive material as is because it is not accompanied by checking the source of information to ensure that the information obtained is accurate. The clear and seeking clarity indicators also have pretty good scores. Based on the results of observations and analysis of teaching modules, the teacher has explained the material contextually and used language that is easy for students to understand. So that students can receive material and do assignments because the directions are given clearly. However, the teacher has not been seen to provide a stimulus that encourages students to ask questions. The results of the student response questionnaire also support this statement, namely that as many as 54% of students stated that the teacher had not provided opportunities or triggered students to ask questions about the material.

In overt indicators, the teacher has not encouraged students to discuss or debate the subject. This can be seen during the observation; the learning method used by the teacher is the discussion method as planned in the teaching module. The learning plan that the teacher conveyed to students regarding discussion has not been fully realized in classroom practice. Even though the teacher has explained that discussion will be an integral part of learning, an atmosphere that encourages students to discuss actively has yet to be created in the classroom. Teachers are more focused on delivering material and inviting students to observe videos without allowing students to participate actively. This creates a

mismatch between what has been planned in the curriculum and its implementation in the classroom. This is supported by the results of the student response questionnaire in which 54% of students stated that teachers rarely invite students to discuss. This will impact the development of students' ideas and thinking, which will be hampered. As stated in Nadia and Delliana (2022), forms of communication such as discussions influence students' interest in learning and hinder the development of thinking. Thus, the teacher needs to improve their learning methods.

The indicator of restraint from impulsivity has a good score. This can be seen when learning; teachers encourage students to consider various possibilities before they make decisions. The teacher also gave students time to think before answering questions. This action affects the indicator of being able to position oneself when guaranteed, where the teacher has encouraged students to consider the various consequences of the student's actions. However, in this indicator, teachers do not help students see various perspectives of a problem. For example, during lesson observations, when discussing the impact of waste on the environment, teachers who only focus on environmental aspects without involving economic, social, and public health perspectives make students lose comprehensive understanding. Understanding various points of view is essential for developing critical and creative thinking skills (Ariadila *et al.*, 2023).

The indicator of sensitivity to friends' abilities has the lowest score compared to other indicators. Other indicators mutually influence this indicator. Based on the results of observations, teachers have not provided opportunities for students to participate in learning or group assignments. This can be seen in the previous discussion, where the teacher must fully implement the discussion method between students. Teachers must be able to create collaborative learning so that students can be more active and involved. In a collaborative learning environment, students try to understand the feelings, knowledge, and abilities of others (Azmi, 2016). Students use this understanding in communicating and encouraging others to appreciate these differences. Therefore, teachers must develop learning methods that encourage active student participation and collaboration.

Creative thinking

The aspect of creative thinking in habits of mind consists of several indicators: taking on tasks even if answers are unclear, creating, using, and improving personal evaluation standards, creating new ways, and exerting effort to the best of one's abilities

(Marzano, 1992). The results of the student response questionnaire regarding teacher learning to build students' habits of mind in the aspect of creative thinking can be seen in Figure 3.

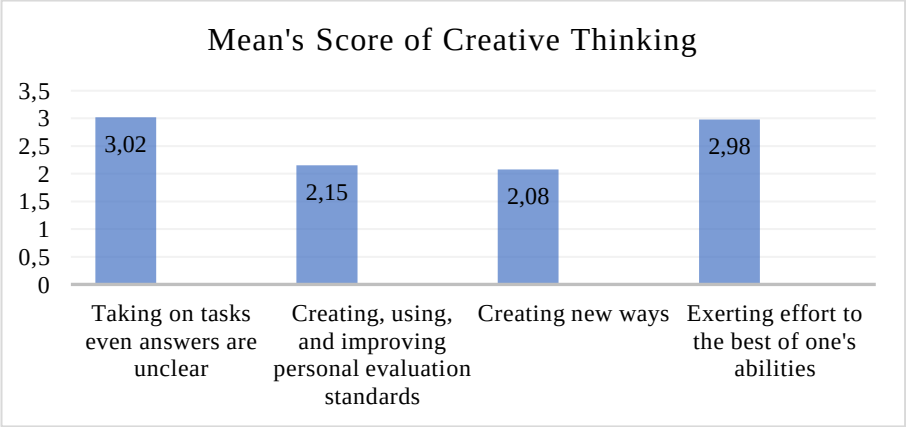

Figure 3. Mean's Score of Creative Thinking

Based on the observations and student response questionnaires, teachers have allowed students to try to complete assignments or problems even though students need clarification on the answers. Teachers appreciate students' efforts even if they are unsuccessful. The indicator of involving oneself in several tasks, even though the answer does not appear to be related to the indicator of making an effort to the limit of ability. This can be seen by the score obtained. Teachers motivate students to be serious about completing assignments, even though the assignment is considered difficult for the students. However, the teacher's motivation is limited to completing tasks; the teacher has yet to encourage students to look for ideas or creative solutions to the assignments or problems. As a result, students solve a problem in only one way, and this method is primarily general. Apart from that, students do not consider whether this method is valid.

Students need more constructive teacher feedback regarding indicators for creating, using, and improving evaluation standards. This makes it difficult for students to identify deficiencies and improve their work appropriately. Apart from that, teachers also have yet to direct students to develop self-assessment criteria. Directing students to develop self-assessment criteria is essential to assist students in evaluating their work independently and objectively (Sani, 2016). In this case, the lack of direction from the teacher can hinder the development of students' metacognitive abilities. As a result, students may get stuck in a cycle of working on assignments without a deep understanding of what is expected and how to achieve it. Teachers must reflect so students can

understand their shortcomings and make appropriate improvements (Anggraeini & Mukhlis, 2023).

CONCLUSION

The research results show that teacher implementation in developing habits of mind in all aspects is relatively low. Thus, students' habits of mind are low because teachers have not helped create and implement them in learning. Even though some students still have good habits of mind, these habits of mind already exist within the students. From these findings, researchers hope they can be used as a basis for designing effective interventions to improve students' habits of mind in biology learning. Differentiated learning, as one of the critical aspects of the Merdeka Curriculum, is a solution to building students' habits of mind. Teachers must be able to develop learning strategies that suit students' learning styles, which can stimulate students' creativity so that learning is more focused on students (student center). Apart from that, teachers also need to pay attention to reflection activities and independent learning.

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