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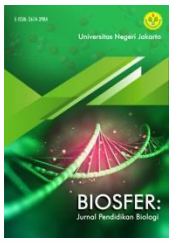

The role of self-awareness and learning discipline during distance learning in urban students

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ABSTRACT

Conceptual understanding is an essential component in achieving meaningful learning outcomes in biology. During distance learning, students are required to regulate their learning independently, making self-awareness and learning discipline important factors that may influence their conceptual understanding. This study aimed to examine the role of self-awareness and learning discipline in distance learning in improving students' conceptual understanding of drug-related material among urban high school students. The research employed a quantitative descriptive correlational design. The study was conducted in a public high school in Jakarta, Indonesia, involving 85 grade XII science students selected through simple random sampling. Data were collected using validated instruments measuring self-awareness, learning discipline, and conceptual understanding. Data analysis included descriptive statistics, prerequisite tests, and regression analysis. The results showed that students' self-awareness and learning discipline were generally in the high category. Regression analysis indicated that self-awareness and learning discipline together contributed 7.1% to students' conceptual understanding of drug material, while 92.9% was influenced by other factors. These findings suggest that although self-awareness and learning discipline play a role in supporting conceptual understanding during distance learning, other internal and external factors should also be considered to improve students' learning outcomes.

INTRODUCTION

Biology is one of the core science subjects taught in senior high schools as part of the 2013 curriculum in Indonesia. The objectives of biology learning are to facilitate students' understanding of fundamental biological concepts and enable them to relate one concept to another (Busyairi et al., 2022; Çakıroğlu et al., 2022; Diella & Ardiansyah, 2020) Biology learning, therefore, needs to be designed to support students' conceptual understanding as well as the development of other essential skills.

Understanding concepts is the ability of students to absorb the meaning of ideas and then be able to explain them again from the knowledge they have (Laliyo et al., 2021; Ningrum et al., 2022). Concepts are basic elements of knowledge (Liu & Fang, 2022). Understanding serves as a crucial foundation for thinking and acting. Students who have a strong understanding of concepts will be able to understand and develop higher concepts and be able to link concepts (Soeharto et al., 2019).

Achievement of learning objectives is influenced by the learning process designed by the teacher and the learning conditions experienced by students. During the last Covid-19 pandemic, the learning process at school had to be carried out at home/distance (Nyadin et al., 2023) especially for areas designated as red zones, such as DKI Jakarta. One of the characteristics of distance education is that there is physical separation between students and teachers (Moore & Kearsley, 2012). This can have an impact on limited direct interaction between teachers and students. Implementing distance learning poses inherent challenges for students, requiring them to adapt to varying learning conditions. Students must independently take control during the learning process, achieve learning outcomes, and determine when to start and complete their assignments (Indriani et al., 2018; Putri et al., 2022). Distance learning demands student discipline and learning independence.

Student learning discipline involves a commitment to adhering to rules and regulations in the pursuit of acquiring new knowledge and skills. Maintaining high levels of discipline and focus can mitigate feelings of laziness and enhance enthusiasm for learning, ultimately improving students' understanding of concepts (Puspasari, 2023; Usman et al., 2022). In the learning process, disciplined students tend to demonstrate better self-regulation in managing their study time, completing assignments, and maintaining consistent participation in academic activities.

One of the factors that contributes to students' learning discipline is self-awareness. Self-awareness enables individuals to introspectively observe themselves, distinguish their identity from others, and position themselves within specific contexts and circumstances. (Carden et al., 2021). Discipline that arises from self-awareness tends to be stronger and more sustainable. Students who have high self-awareness will tend to have high enthusiasm for learning, motivating them to persist in their efforts and achieve optimal outcomes (Saroji et al., 2021).

In Biology education, one of the topics covered is drug-related material. In learning this material, students are required to understand the concept and its practical application in daily life. Students' correct understanding of these concepts is vital as it can help prevent drug abuse among students. Therefore, it is necessary to know how students' self-awareness and learning discipline contribute to enhancing their understanding of concepts in NAPZA material during distance learning.

The context of urban education also needs to be considered when examining students' learning behavior during distance learning. Students living in urban areas generally have greater access to digital technology, internet connectivity, and online learning platforms compared to those in non-urban areas (Astari & Yulianto, 2025; Zhao et al., 2022). These conditions influence students' learning experiences, particularly in managing independent learning activities during online learning. Urban students tend to interact more intensively with digital learning environments, which can support the development of learning autonomy and self-awareness (Safitri et al., 2024; Sholichah et al., 2023). However, the high exposure to digital media in urban environments may also create distractions that potentially affect students' learning discipline and concentration during distance learning. Therefore, examining self-awareness and learning discipline among urban students become important to understand how these factors contribute to students' conceptual understanding during distance learning. Previous studies have examined the influence of learning discipline and self-regulation on academic achievement. However, limited studies have specifically explored the combined role of self-awareness and learning discipline in supporting students' conceptual understanding in biology learning during distance learning, particularly in urban educational contexts.

The results of this research can provide information about the role of self-awareness and learning discipline in achieving optimal learning processes and outcomes. The results of this research can serve

as valuable insights for educators when designing instructional strategies, emphasizing the importance of nurturing students' self-awareness and fostering learning discipline. Moreover, the output of this research can contribute to the development of biological science and learning.

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METHODS

Research Design

This study employed a quantitative descriptive method with a correlational research design. Correlational research is used to examine the relationship between two or more variables without manipulating them (Creswell, 2012). In this study, the relationships between self-awareness (X1), student learning discipline (X2), and conceptual understanding of NAPZA material during distance learning (Y) were analyzed to determine the extent to which the independent variables contribute to students' conceptual understanding

Population and Samples

The population of this study consisted of all students at the research school. The accessible population included five classes of grade XII science students, which were selected using purposive sampling based on their participation in distance learning during the research period. From a total of 108 students in these classes, 85 students were selected as research participants using simple random,sampling. The sample size was determined using the Taro Yamane formula. Demographic information, such as age and gender, was not included in the analysis because these data were not collected during the initial data collection process.

Instrument

Since this research was conducted in an urban educational setting, students are generally familiar with the use of digital devices and online learning platforms during distance learning. Urban students tend to engage more frequently with digital technology in their daily academic activities, which may influence their learning discipline and self-awareness in managing independent learning tasks. The urban learning environment also provides greater exposure to digital information sources that may shape students' learning behavior and engagement during online learning (Sholichah et al., 2023). Therefore, the instruments used in this study were designed to measure students' self-awareness, learning discipline, and conceptual understanding within the context of urban distance learning environments. The framework for the self-awareness instrument refers to recognizing feelings and behavior, recognizing strengths and weaknesses, having an independent attitude, making the right decisions, being skilled in expressing thoughts, feelings, opinions, and beliefs, evaluate yourself (Castine et al., 2019)

The indicators of self-awareness used in this study describe students' ability to recognize their emotions, identify their strengths and weaknesses, and regulate their learning behavior. The indicator recognizing feelings and behavior refers to students' ability to understand their emotional states and how these influence their learning activities. Recognizing strengths and weaknesses refers to students' awareness of their learning capabilities and limitations. An independent attitude reflects students' ability to take responsibility for their learning. Decision-making indicates the ability to choose appropriate learning strategies. Expressing thoughts and opinions represents students' ability to communicate ideas in learning situations. Meanwhile, self-evaluation reflects students' ability to reflect on their learning process and outcomes.

The instrument consisted of multiple-choice questions with five options. The validity of the self-awareness instrument was tested using the Pearson product-moment correlation. The results of the self-awareness validity test showed that out of 40 items tested, 30 items were valid and 10 items were invalid. A reliability test was conducted using the Cronbach's Alpha formula with a significance level of 0.05. The reliability test results produced a reliability coefficient of 0.935, indicating that the instrument is reliable. The framework of the learning discipline instrument consists of statements with five response options, including learning discipline indicator, obedience, body hygiene, seriousness in academic assignments, accuracy in handling tasks, neatness in writing, politeness, and harmony with other students, harmony with teachers (Simba et al., 2016).

The indicators of learning discipline in this study describe students' adherence to rules and responsible behavior during the learning process. Obedience refers to students' compliance with rules,

instructions, and learning schedules established during the learning process. Body hygiene reflects students' awareness of maintaining personal cleanliness and neat appearance as part of their readiness for learning activities. Seriousness in academic assignments describes students' commitment and responsibility in completing academic tasks diligently and avoiding procrastination. Accuracy in handling tasks indicates students' carefulness and attention to detail when completing assignments according to the instructions provided. Neatness in writing refers to students' discipline in presenting written work clearly, systematically, and in an organized manner. Politeness and harmony with other students reflect students' ability to maintain respectful communication and cooperative relationships with peers during learning activities. Meanwhile, harmony with teachers refers to students' respectful attitudes, positive interactions, and willingness to follow teachers' guidance during the learning process.

The validity of this instrument was tested using the Pearson Product-Moment correlation. The test results showed that 33 items were valid out of a total of 35 items. The reliability of the instrument was tested using Cronbach's Alpha with a significance level of 0.05. The results showed a reliability coefficient of 0.961, indicating that the instrument is highly reliable.

The conceptual understanding instrument was developed based on a framework that consists of multiple-choice questions with five dimensions: interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining (Anderson & Krathwohl, 2010). Interpreting refers to students' ability to understand and translate information from one form to another, such as interpreting statements, diagrams, or data related to NAPZA material. Exemplifying describes students' ability to provide relevant examples that represent a particular concept. Classifying refers to students' ability to categorize objects, phenomena, or information based on specific characteristics or conceptual criteria. Summarizing indicates students' ability to identify the main ideas and present essential information in a concise form. Inferring refers to students' ability to draw logical conclusions based on the information or evidence provided. Comparing describes students' ability to identify similarities and differences between two or more concepts, ideas, or phenomena related to the learning material. Meanwhile, explaining refers to students' ability to construct cause-and-effect relationships and describe processes or mechanisms related to biological concepts.

The validity of the instrument was tested using the Point Biserial correlation, and reliability was tested using the Kuder–Richardson formula (KR-20) with a significance level of 0.05. The reliability coefficient obtained was 0.478, indicating a moderate level of reliability that is still acceptable for exploratory educational research.

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Data Analysis Techniques

The data analysis techniques used include descriptive analysis, data analysis prerequisite tests, and hypothesis testing. The prerequisite tests for data analysis consist of a normality test using the Kolmogorov-Smirnov test ($\alpha = 0.05$) and a homogeneity test using the Bartlett test ($\alpha = 0.05$). Hypothesis testing uses simple linear regression tests, multiple linear regression tests, and correlation tests. For descriptive analysis, students' scores were analyzed using descriptive statistics to determine the general tendencies of each research variable.

RESULT AND DISCUSSION

This section presents the results of data analysis regarding students' self-awareness, learning discipline, and conceptual understanding of NAPZA material during distance learning. The findings are presented through descriptive statistics and regression analysis to examine the relationships among the research variables. The discussion interprets these findings by relating them to relevant theories and previous studies.

Self-awareness

The results show that students' self-awareness falls into two categories, which are very high 12.9%) and high 87.1%, as presented in Figure 1. These results indicate that most students demonstrate a high level of awareness of their own learning processes and responsibilities during distance learning.

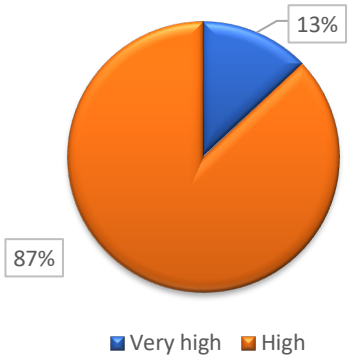

Figure 1. The Criteria for Self-Awareness Scores Interpretation

A high level of self-awareness suggests that students are able to recognize their learning behavior, evaluate their learning progress, and regulate their learning activities independently. Self-awareness is an important component of self-regulated learning because students who are aware of their strengths and weaknesses are more capable of planning, monitoring, and evaluating their learning processes. According to self-awareness theory, individuals direct their attention inward and evaluate their behavior based on internal standards and values (Cardenas et al., 2021). This ability is particularly important in distance learning environments where students must take greater responsibility for managing their learning activities

The relatively high level of self-awareness observed in this study may also be influenced by the characteristics of students living in urban areas. Urban students are generally exposed to various sources of information and digital learning environments that encourage them to manage their learning more independently. The integration of digital technology in education can promote students' engagement and autonomy in learning activities (Haleem et al., 2022). However, urban environments may also expose students to digital distractions that can influence their learning behavior and emotional regulation during distance learning. The percentage of achievement for each indicator on the self-awareness variable can be seen in Figure 2

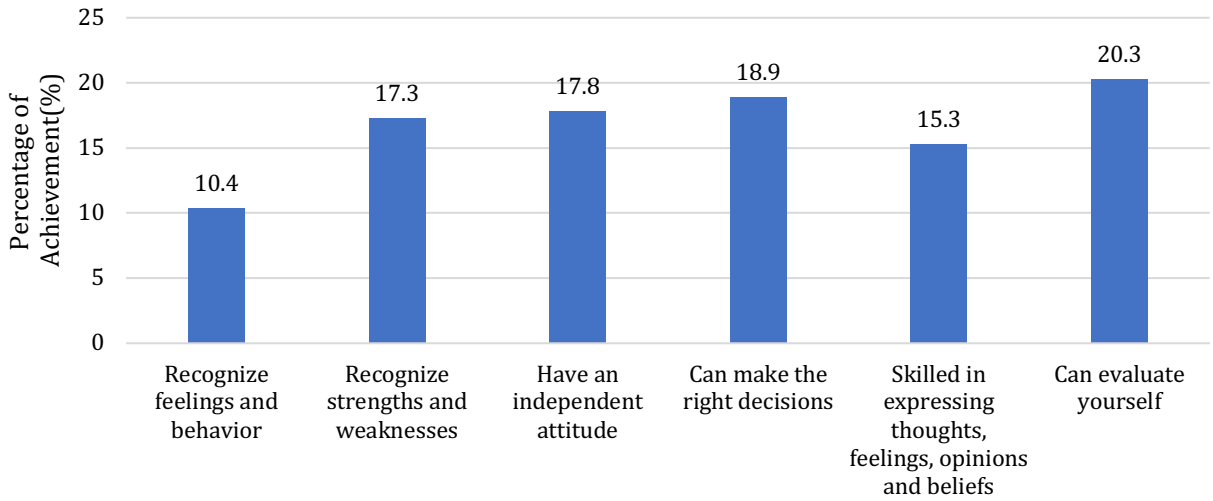

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Figure 2. Percentage of Achievement of Self-Awareness Indicators

Based on Figure 2, it can be seen that the highest percentage is found in the indicator of being able to evaluate yourself, which is 20.3%. This indicator relates to students' capacity to explore their own strengths and weaknesses. High percentage results show that students can self-assess with the aim of improving, controlling, evaluating themselves, exploring themselves through the experiences they go through, and receiving good input from others. Students who can identify their strengths and weaknesses and work towards improving them to achieve better goals (Improvement Goal)(Purmanah et al., 2017)

The lowest percentage was found in the indicator of recognizing feelings and behavior, which is 10.4%. This indicator is related to students' ability to acknowledge their own emotions, enabling them to self-reflect on the feelings they experience and the corresponding behaviors they exhibit. A low percentage in this aspect may stem from students' inability to recognize and comprehend their emotions and behaviors, hindering their capacity to identify the feelings they undergo, their root causes, associated behaviors, and the repercussions for others. This could result from students' struggles in managing their emotions, as teenagers are often prone to emotional upheavals while simultaneously facing societal pressure to adapt. Individuals' adept at emotional regulation tend to exhibit greater responsibility, enhanced attentiveness, improved self-awareness, and consequently, higher scores on academic assessments. (Rahmadani & Setiawati, 2023). Previous studies have also reported that self-awareness is significantly associated with students' learning discipline and academic performance (Agung et al., 2023)

Learning Discipline

The learning discipline score falls into two criteria, which are very high criteria, with a total of 29 students (34.1%), and high criteria, with a total of 56 students (65.9%), which can be seen in Figure 3.

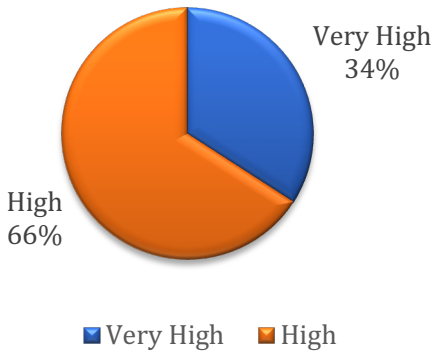

Figure 3. The Criteria For Student Learning Discipline Scores Interpretation

Based on Figure 3, student learning discipline tends to be high, indicating that students demonstrate the ability to self-control and organize their learning approach, demonstrate positive conduct, and adhere to the rules and regulations governing biology education during distance learning. Furthermore, students exhibit an awareness of the significance of discipline and responsibility in their academic pursuits. The characteristics of students with learning discipline are evident in their conscientiousness towards optimizing their learning experience, coupled with their adherence to and compliance with rules and regulations. These students demonstrate obedience to school protocols, maintain disciplined behavior both during classes and self-study sessions, adhere to structured study schedules, and engage in regular study habits (Puspasari, 2023). This learning discipline contributes to the achievement of learning outcomes (Dewi et al., 2020; Sudiartini et al., 2021).

The percentage score for each indicator on the learning discipline variable can be seen in Figure 4.

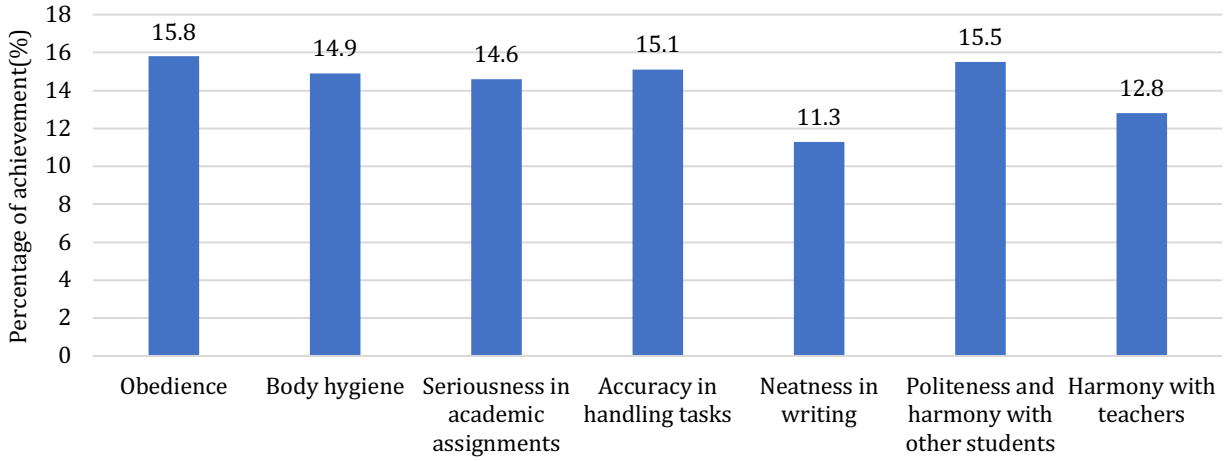

Figure 4. Percentage of Achievement of Student Learning Discipline Indicators

Based on Figure 4, the highest percentage is in the compliance indicator, with a percentage of 15.8%. This indicator relates to the rules and regulations that students must comply with in biology learning activities during distance learning. The high percentage results reflect students' capability to self-regulate and organize themselves, enabling them to adhere to the established rules and regulations in biology learning during distance learning. In distance learning, students must be able to organize all their actions to achieve the desired results. (Putri et al., 2022). Students must have the awareness within themselves to act obediently, adhere to the rules, and be aware of their obligations. This will form a disciplined attitude towards learning.

The lowest percentage was found in the neatness indicator in writing, which is 11.3%. This indicator relates to students' capacity for writing or notes-taking on biology material during distance learning. The low percentage results could be because some students rarely engage in note-taking or handwriting activities related to the study material. Instead, they may opt to type on their devices during distance learning sessions. This tendency could be attributed to the prevalent use of e-learning platforms, where students are accustomed to utilizing digital devices. However, it's worth noting that handwriting stimulates the cognitive system and motor skills, aids in organizing and conceptual mapping, and facilitates a deeper understanding of information. (Mahmur et al., 2022). The decrease in students' ability in manual writing can be seen during the collection of assignments. There has been a notable decrease in students' inclination towards manual writing, particularly for submitting assignments during distance learning. This decrease is further evidenced by the diminishing frequency of assignments submitted in handwritten form. (Purnami, 2022)

Concept Understanding

The concept understanding score falls into three very high criteria, with a total of 40 students (47.1%); high criteria, with a total of 41 students (48.2%); and quite high criteria, with a total of 4 students (4.7%), which can be seen in Figure 5.

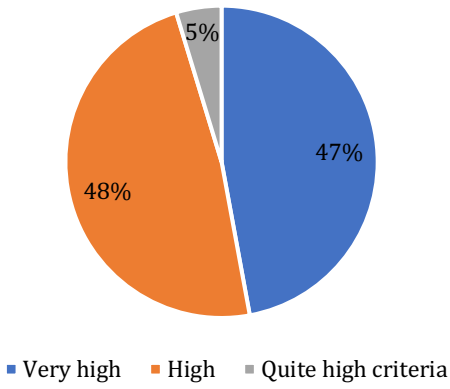

Figure 5. The Criteria for Concept Understanding Scores Interpretation

High understanding of the concept shows that students have a good understanding of the learning material, in this case is drug material. Conceptual understanding is a fundamental component of meaningful learning in biology because it enables students to connect scientific concepts with real-life situations. In the context of NAPZA material, conceptual understanding is particularly important because it helps students recognize the health risks associated with drug abuse and develop responsible attitudes toward drug-related issues. Students' high understanding of concepts is due to their discipline and high learning motivation. Students with high and focused learning discipline are also likely to enhance their learning capabilities in understanding the taught concepts (Muzamil, 2018). Biology learning motivation and student discipline are factors that can influence student learning outcomes during online learning (Heryanti et al., 2022). The percentage score for each dimension in the concept understanding variable can be seen in Figure 6.

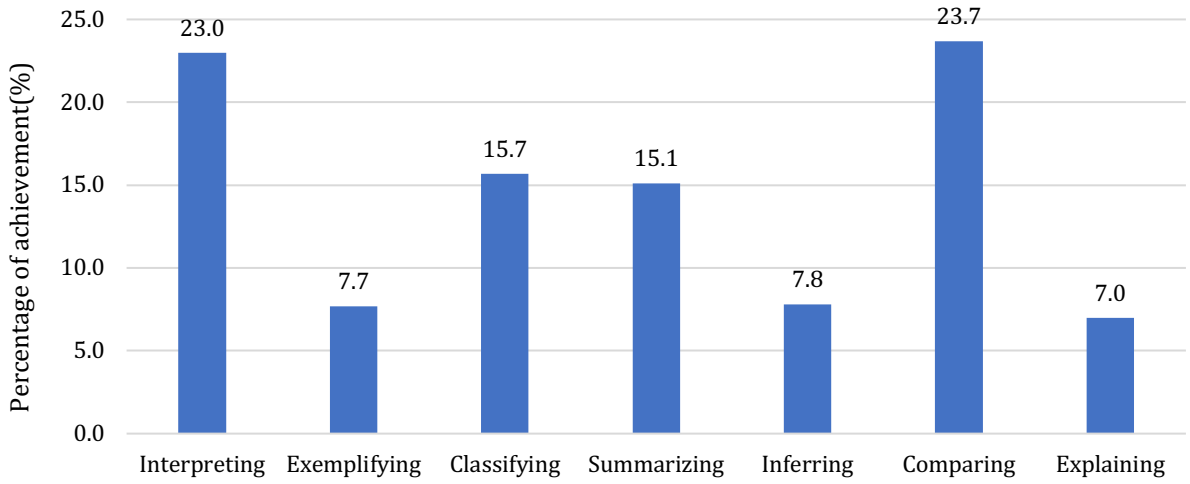

Figure 6. Percentage of Achievement of Concept Understanding Dimensions

Based on Figure 6, the highest percentage is in the Comparing dimension, which is 23.7%. This dimension is related to detecting similarities and differences between two objects, ideas or situations in NAPZA material. The lowest percentage is in the Explaining dimension, which is 7.0%. This dimension is related to constructing and using cause-and-effect models in NAPZA material. The Comparing dimension is greater than the Explaining dimension, indicating that students can know and conclude well the differences or similarities between two things in NAPZA material, such as knowing the physical changes due to drug abuse and knowing the difference between narcotics and psychotropic substances. The Explaining dimension shows low percentage results, which may be attributed to students' reduced capacity to further identify specific case examples for NAPZA material. This shortfall could be linked to a scarcity of case examples provided by the teacher, or potentially to a less interactive learning environment (Azrai et al., 2023). The use of learning media by teachers also influences student learning outcomes (Jannah & Atmojo, 2022; Rini et al., 2024; Susanti et al., 2021). The challenges in comprehending the material can also stem from its rapid delivery, an insufficiently interactive learning process, and an over-reliance on lecturing by teachers, thereby limiting students' opportunities to ask questions. Consequently, students may encounter difficulties in tackling questions that necessitate further identification using case examples. (Dalman & Junaidi, 2022).

The relationship between self-awareness and conceptual understanding was then analyzed using simple linear regression. The regression equation obtained was $\hat{Y} = 0.481X1 + 42.9$. The regression results indicate that an increase of one unit in self-awareness is associated with an increase of 0.481 units in students' conceptual understanding. The relationship between X1 and Y can be seen in Figure 7.

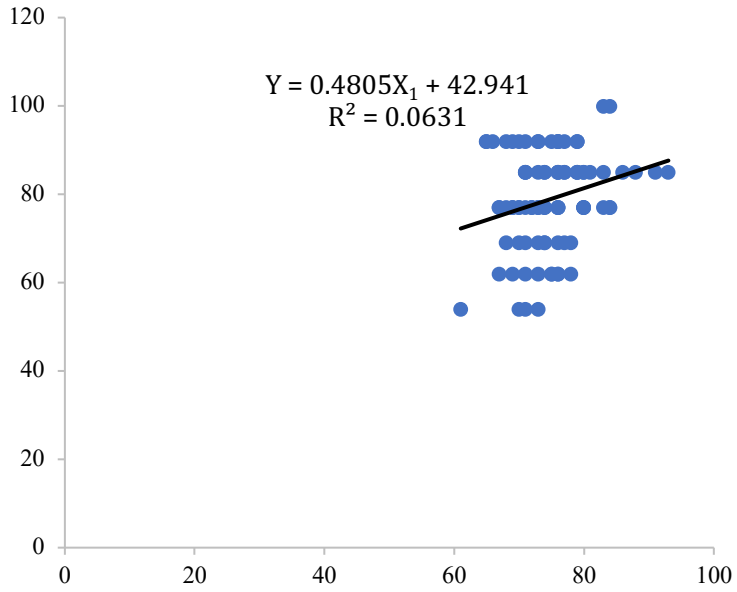

Figure 7. Linear Regression Model of The Relationship Between X1 And Y

The coefficient of determination analysis shows that self-awareness contributes 6.3% to students' conceptual understanding of NAPZA material, while the remaining 93.7% is influenced by other factors. Although the contribution is relatively small, this finding suggests that students' awareness of their own learning behavior still plays a role in supporting conceptual understanding. In distance learning environments, self-awareness helps students monitor their learning progress, regulate their learning strategies, and maintain motivation despite limited direct supervision from teachers. These findings are consistent with previous research, which reported that self-awareness has a positive relationship with students' conceptual understanding, although the strength of the relationship may vary depending on other influencing factors (Pujiastuti et al., 2023).

The low value of the coefficient of determination can be due to several other factors that can contribute to student learning outcomes besides self-awareness. Another contributing factor could be the challenge students face in regulating their emotional intelligence, particularly given that high school students are typically in their teenage years. Emotional intelligence is the ability to understand the emotions and feelings of oneself and others as a guide in the process of thinking and behaving (Septiana et al., 2023). This is in line with the results obtained based on the lowest percentage of students' self-awareness indicators, which are the indicators of recognizing feelings and behavior. Students may struggle to regulate their emotions as they can be easily swept up by emotional turmoil, while simultaneously facing expectations to adapt, particularly in pandemic conditions. Emotional intelligence is intricately linked to cognitive functioning, as both operate dynamically. (Pranindhita, 2020). Emotional intelligence can significantly impact student learning outcomes, as individuals who effectively manage their emotions are more adept at comprehending their mental states, which can, in turn, stimulate their cognitive abilities. (Siregar et al., 2019)

The relationship between learning discipline and conceptual understanding was then analyzed using simple linear regression. The results of the regression equation obtained were $\hat{Y}$ = 0.312X2 + 54.48. The results indicate that an increase of one unit in learning discipline is associated with an increase of 0.312 units in conceptual understanding. The relationship between student learning discipline and understanding of concepts in NAPZA material during distance learning can be seen in Figure 8.

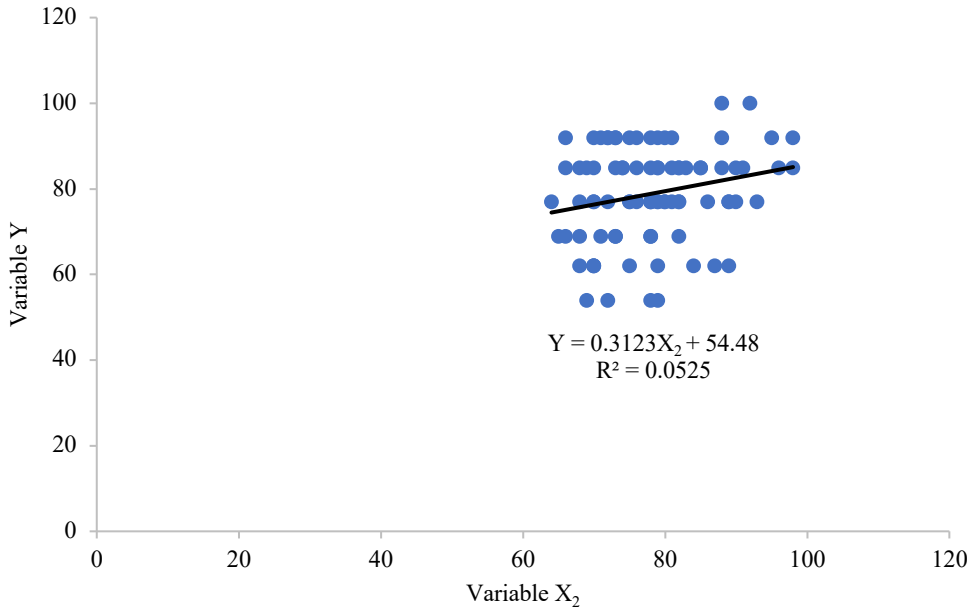

Figure 8. Linear Regression Model Of The Relationship Between X2 And Y

Figure 8 shows that each 1-point increase in variable X2 is associated with a 0.312 increase in variable Y, holding 54.48 constant. The coefficient of determination analysis indicates that learning discipline accounts for 5.2% of the variance in students' conceptual understanding. This relatively small contribution suggests that learning discipline alone may not be the primary factor influencing students' conceptual understanding. The low coefficient of determination value suggests that student learning discipline may not be the primary factor influencing students' understanding of concepts. Instead, it indicates the presence of other potential factors that could also impact students' understanding. Concept understanding can be influenced by internal factors such as self-confidence, learning discipline, self-efficacy, and metacognitive awareness. (Muzamil, 2018; Pujiastuti et al., 2023; Putri et al., 2022). Other internal factors, such as students' attitudes toward learning, motivation levels, concentration during learning, processing of learning materials, exploration of learning outcomes, self-confidence, and study habits, also play a significant role in shaping students' understanding of concepts. Additionally, external factors like school environments, teacher influences, peer interactions, and the instructional approaches employed by teachers contribute to this dynamic as well. The relationship between self-awareness, learning discipline, and understanding of concepts was then analyzed using multiple linear regression. The results of the regression equation obtained were $\hat{Y} = 40.97 + 0.339X1 + 0.161X2$, for self-awareness (X1), student learning discipline (X2), and understanding of concepts in NAPZA material during distance learning (Y).

Multiple linear regression analysis was conducted to examine the combined influence of self-awareness and learning discipline on conceptual understanding. The regression equation obtained was: $\hat{Y} = 40.97 + 0.339X1 + 0.161X2$. The results show that self-awareness and learning discipline together contribute 7.1% to students' conceptual understanding of NAPZA material during distance learning. Although the contribution is relatively small, the results indicate that both variables play a role in supporting students' understanding of biological concepts. The relatively low coefficient of determination suggests that students' conceptual understanding is influenced by various other factors beyond self-awareness and learning discipline. These factors may include students' motivation, prior knowledge, learning environment, instructional strategies, and the use of learning media.

The urban context of the research setting may also influence students' learning behavior. Students living in urban areas generally have greater access to digital technology and online learning resources, which can support independent learning during distance learning. However, the same environment may also create distractions due to intensive exposure to digital media. Therefore, improving students' conceptual understanding requires not only the development of learning discipline and self-awareness but also the implementation of effective learning strategies that support active student engagement.

CONCLUSION

The results of this study indicate that urban high school students generally demonstrate high levels of self-awareness and learning discipline during distance learning. Self-awareness and learning discipline are positively related to students' conceptual understanding of drug and alcohol content during distance learning. Self-awareness contributed 6.3%, and learning discipline contributed 5.2% to students' conceptual understanding, while both variables together contributed 7.1%. These findings suggest that although the contributions of self-awareness and learning discipline are relatively small, both variables still play a role in supporting urban students' conceptual understanding during distance learning. Students who demonstrate higher levels of self-awareness and learning discipline tend to demonstrate better conceptual understanding of biology learning materials. Based on these findings, teachers are advised to design learning strategies that encourage students to develop self-awareness and learning discipline, particularly in distance learning environments. Future research is recommended to explore other factors that may influence students' conceptual understanding, such as learning motivation, self-efficacy, and learning strategies.

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