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The Effect of Emotional Intelligence and Learning Style on Biology Learning Outcomes of Class XI MIPA Students at SMA Negeri 4 Jember Academic Year 2022/2023

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Abstract In the context of education in Indonesia, particularly in schools, a prevalent problem persists wherein a significant number of students exhibit a lack of concentration towards their studies and instead engage in various extracurricular pursuits. The objective of this study is twofold: To determine the combined impact of emotional intelligence and learning styles on the biology learning outcomes; and to ascertain the individual effects of emotional intelligence and learning styles on the biology learning outcomes. This study employs a quantitative methodology utilizing survey research techniques conducted at SMA Negeri 4 Jember. The researcher employed Arikunto's sampling technique, which states that if the number of participants is fewer than 100, the entire population can be considered as the research sample. In this study, a sample of 60 pupils was taken. Data collecting methods employ surveys and documentation, while data analysis involves the utilization of multiple linear regression. The research findings indicate that the F count value of 11.532 is statistically higher than the F table value of 3.16. Therefore, it can be concluded that the combination of emotional intelligence and learning style has a significant impact on the biology learning outcomes of class XI MIPA students at SMA Negeri 4 Jember. Furthermore, the emotional intelligence (t_{count} 2,968 > t_{table} 1,672) and learning styles (t_{count} 2,849 > t_{table} 1,672) individually also has a direct influence on the biology learning outcomes of class XI MIPA students at SMA Negeri 4 Jember.

Keywords: Biology learning outcomes, Emotional intelligence, Learning style, Survey research

INTRODUCTION

Emotional intelligence, characterised by distinct capabilities, is commonly known as EQ (Emotional Quotients) or EI (Emotional Intelligence) in colloquial terms. Emotional intelligence refers to the capacity to self-motivate and endure frustration, exercise impulse control and avoid excessive indulgence, manage mood and prevent stress from impairing cognitive abilities, empathise with others, and maintain focus during prayer.

The concept is delineated by four distinct categories, specifically self-awareness, self-management, social awareness, and relationship management. The acquired abilities facilitate outstanding performance in professional settings or in a leadership role. This encompasses areas that are clearly advantageous, such as the ability to understand and share the feelings of others, a favourable attitude, and the ability to regulate one's own emotions and behaviour. These talents encompass crucial skills such as accomplishment, impact, conflict resolution, collaboration, and motivational leadership (Goleman, 2017).

Schools continue to grapple with the management of students' emotional intelligence. Students vary in their levels of emotional intelligence. Some individuals possess great emotional intelligence but low cognitive intelligence, while others possess low emotional intelligence but high cognitive intellect. Currently, emotional and spiritual intelligence have assumed more significance in life, surpassing the importance of academic intelligence.

Emotional intelligence is independent of a student's intellectual capacity and instead relies on their individual character traits. Emotions are the predominant manifestation of a student's personal character. Emotions can be categorised as sadness, anger, fear, joy, delight, love, surprise, annoyance, and embarrassment. Students with proficient emotional regulation skills will cultivate elevated emotional intelligence. Emotional intelligence has a significant impact on both learning achievement and achieving optimal learning outcomes (Ratnasari et al., 2022; Andira, 2020).

The occurrence seen in the field of education in Indonesia indicates that the effective use of learning style theory in the instructional process within schools has not been put into practice. Education is an essential process for achieving balance and excellence in individual and societal growth (Oktafia et al., 2022). Learning style refers to the specific approach or method that students use to acquire information and comprehend ideas during the learning process (Prastiwi, 2016).

The majority of teachers continue to utilise the didactic technique during learning activities. Despite the modifications made to the curriculum in 2013, which primarily focused on student-centered learning, its implementation in schools remains incomplete. There is still a prevailing emphasis on teachers and the utilisation of traditional teaching methods, such as lectures, with books being the exclusive learning materials. Consequently, when professors just employ the lecture approach, there are pupils who actively engage and there are students who fail to pay attention, become preoccupied, or even wander about. This discrepancy

arises due to a mismatch between the student's learning style and the instructional methods employed by the teacher.

Students continue to encounter challenges in comprehending the course material. Learning style is evaluated as the customary approach that students employ to comprehend and assimilate information. It is asserted that youngsters have a unique learning style. Some individuals have a greater aptitude for learning through visual stimuli, specifically students who have a better ability to remember information when it is presented in a visually engaging format, such as pictures, diagrams, and graphs. On the other hand, there are students who learn more effectively through auditory means, often engaging in verbal communication while learning, moving their lips when reading, having a knack for storytelling, being easily distracted by noise. Additionally, there are students who have a preference for kinesthetic learning, meaning they learn best through physical activities, enjoy role-playing, prefer project-based work, and have a tendency to be more active.

Students possess a multitude of learning styles, with each student exhibiting a unique learning preference. According to Prastiwi (2016), selecting the appropriate learning style will yield optimal outcomes for pupils. Learning outcomes are a representation of the extent to which students have achieved mastery, assessed by the total score or percentage of correct answers on tests aligned with the established learning objectives.

Learning outcomes refer to the degree of achievement or proficiency that students attain in comprehending educational content subsequent to engaging in the learning activities (Nasution et al., 2023; Hidayah et al., 2022l; Harahap et al., 2019). Learning outcomes are commonly described as student achievements, which include both high- and low-level cognitive outcomes (Romdaniyah et al., 2023). Learning outcomes can be categorised as either predetermined learning outcomes that have been intentionally established beforehand, or as incidental learning outcomes that are not explicitly specified in the instructional design. Examples of incidental learning outcomes include polite behaviour, discipline, critical attitudes, and others. (Prastiwi, 2016). In a study conducted by Apriani et al. (2019), who were mathematics education students at Tadulako University, the research titled "The Influence of Emotional Intelligence and Cognitive Style on the Mathematics Learning Outcomes of Class SMA Negeri 4 Palu" found a significant result with a p-value of 0.000 <0.05.

Emotional intelligence is comprised of five distinct indications, which are: self awareness (emotional recognition): the ability to acknowledge and comprehend one's own moods and emotions, as well as identify the underlying factors influencing them; self-regulation refers to an individual's capacity to effectively manage their emotions, allowing for proper expression and maintaining internal equilibrium; motivation (self-motivation): the act of inspiring oneself to succeed, namely through the cultivation of enthusiasm, passion, optimism, and self-assurance; empathy, or the capacity to discern concealed social cues that reveal the emotional states and requirements of others; and social skills: the capacity to

effectively manage emotions while interacting with others and accurately interpret social situations to establish suitable social connections.

Learning styles comprise a set of individual characteristics that affect how certain students engage with educational content, while others may not respond in the same way (Jannah et al., 2022). Goleman (2017) stated that learning styles are categorised into three sorts of indicators, which are as follows: (i) Visual Learning Style: Individuals with a visual learning style acquire knowledge more effectively through visual stimuli. They have a heightened ability to comprehend and absorb information when presented in visual formats. They tend to prefer an organised and structured environment and are less likely to be distracted by noise. However, they may have challenges when understanding information that is conveyed verbally. (ii) The auditory learning style is characterised by a preference for learning by hearing. Individuals with this style think more efficiently when they can speak out loud. They are particularly sensitive to the sound of music and are frequently distracted by noise. However, they may struggle with processing visual information. (iii) The kinesthetic learning style is characterised by a preference for physical movement, sensitivity to expressions and body language, a reliance on trial and error, a lack of neatness, and difficulties in digesting spoken information (Porter and Hernacki, 2015).

Previous research findings indicate a potential correlation between emotional intelligence and learning styles, as well as physiological learning outcomes, both independently and in combination. Researchers aim to explore this issue in order to uncover a vast amount of information about the correlation between emotional intelligence, learning styles, and physiological learning outcomes. This study has two main objectives: 1) To assess the collective influence of emotional intelligence and learning styles on biology learning results; 2) To examine the separate impacts of emotional intelligence and learning styles on biology learning outcomes. This research was conducted ethically, with all necessary approvals obtained prior to the study

METHOD

The methodology employed in this research is a quantitative technique, as it involves the presentation of research data in numerical form and the utilisation of statistical analysis for data interpretation. This study employs survey research methodologies. The survey method is a technique employed to gather data pertaining to opinions, attitudes, values, desires, behaviour, and other related factors. The researchers had direct meetings with biology teacher as well as representatives of class XI MIPA students in order to gather preliminary data and information. The study involved researchers conducting classroom observations during classes to determine the impact of emotional intelligence and learning styles on the biology learning outcomes of class XI MIPA students at SMA Negeri 4 Jember for the 2022/2023 academic year. The variables examined in this study encompass emotional intelligence, learning styles, and biological learning outcomes.

The population for this study consisted of all 88 students in class XI MIPA at SMA Negeri 4 Jember. A sample of 60 individuals, specifically from class XI MIPA 1 and XI MIPA 2, was selected by the researchers based on Arikunto's (2010) recommendation on minimum sampling quota. Data collection procedures encompass the dissemination of questionnaires and the gathering of documents. The data gathering devices employed encompassed questionnaires to acquire data on emotional intelligence and learning styles, alongside teacher and school records to get data on the biology learning outcomes of the sample. The researchers created a questionnaire using a Likert scale, which assigned a value of 4 to "Strongly Agree," a value of 3 to "Agree," a value of 2 to "Disagree," and a value of 1 to "Strongly Disagree" (Sugiyono, 2017).

The emotional intelligence questionnaire utilised in this study was based on Andira's (2020) instrument grid. It comprised of the following variables: (i) self-awareness, assessed through 3 question items, (ii) emotional management, assessed through 5 question items, (iii) motivation, assessed through 6 question items, (iv) empathy, assessed through 2 question items, and (v) social skills, assessed through 4 question items. There are a total of 20 questions in the emotional intelligence questionnaire instrument. The learning style questionnaire instrument grid used in this study was derived from Sugianto (2021) and has three categories: visual (with 5 question items), auditory (with 5 question items), and kinesthetic (with 5 question items). The school acquired data on student learning outcomes by documenting the results of the students' midterm exams. Students' midterm exams data is acquired from the subject teacher.

All data collection instruments utilised in this research have been deemed valid and reliable. Instrument validity is assessed based on its content and construct. Content validity is conducted to assess the precision of the questionnaire in measuring the specific variables of interest. Content validation is conducted by a proficient lecturer specialising in Biology Education at UIN Kiai Haji Achmad Siddiq Jember. The construct validity of the questionnaire was assessed by administering it to a sample of 20 biology students in class XI MIPA 3 at SMAN 4 Jember. The construct validity analysis revealed that question item number 2 on the emotional intelligence test was deemed invalid. Consequently, this particular question item was excluded from the research. The results of the construct validity assessment revealed that question item number 3 on the learning styles questionnaire was deemed invalid. Consequently, this question item was eliminated from the research analysis. The reliability test conducted using SPSS 21 revealed that the Cronbach's Alpha reliability coefficient for the emotional intelligence questionnaire was 0.92, while for the learning styles questionnaire it was 0.934. Therefore, both questionnaires were deemed to be reliable ($r11>0.6$) and can be utilised as data gathering instruments in this study.

The data analysis was conducted using descriptive statistical methods and inferential statistics (Fitri et al., 2023). Prior to doing inferential analysis, preliminary tests are performed on the collected data. The precondition tests conducted include the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

FINDINGS AND DISCUSSION

The research findings indicate that the emotional intelligence of class XI MIPA students at SMA Negeri 4 Jember was quite high. The study revealed that the learning style of class XI MIPA students at SMA Negeri 4 Jember was assessed as satisfactory. The learning outcomes of class XI MIPA students at SMA Negeri 4 Jember are highly commendable. Table 1 provides a summary of the data on emotional intelligence, Table 2 presents a review of the data on learning styles, and Table 3 presents a summary of the data on learning outcomes.

Table 1. Emotional intelligence questionnaire results.

No	Category	Total	Percentage
1	Very good	1	2%
2	Good	48	80%
3	Adequate	11	18%
4	Bad	0	0%
	Total	60	100%

Table 2. Learning style questionnaire results.

No	Category	Total	Percentage
1	Very good	1	2%
2	Good	43	72%
3	Adequate	16	26%
4	Bad	0	0%
	Total	60	100%

Table 3. Student learning outcome data.

No	Score Achievement Level	Frequency	Percentage	Category
1	80 – 100	34	57%	Very good
2	60 – 79	26	43%	Good
3	40 – 59	0	0%	Adequate
4	20 – 39	0	0%	Bad
	Total	60	100%	

Prior to conducting the hypothesis test, a precondition test is performed initially. The normality test findings are presented in Figure 1, the multicollinearity test results are summarised in Table 4, the heteroscedasticity test results are displayed in Figure 2, and the autocorrelation test results are summarised in Table 5.

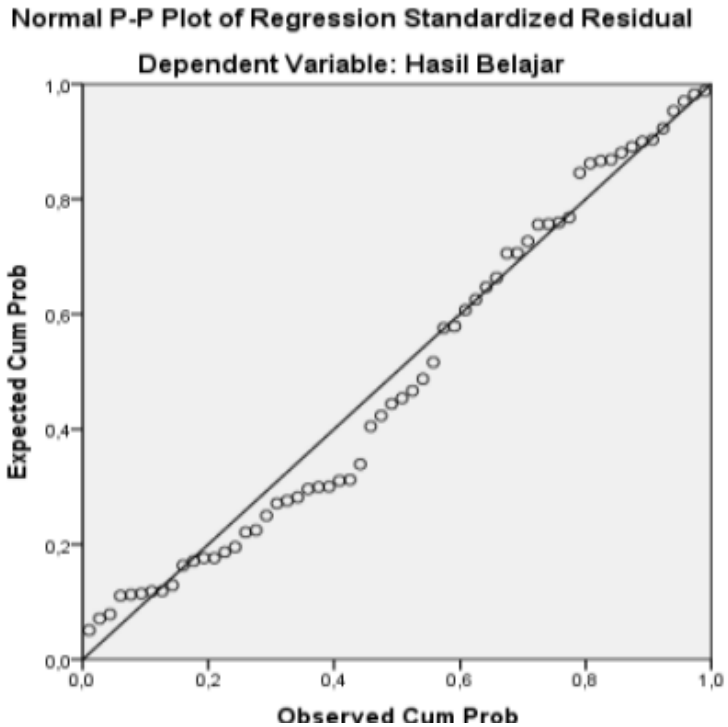

Figure 1. Normality test results.

According to Figure 1, the data is dispersed along the diagonal line and aligns with its direction. This indicates that the data follows a normal distribution, satisfying the assumptions of normality in the regression model. According to Table 4, the VIF value was determined to be 1.076, which is below the threshold of 2.00. Consequently, the regression model employed in this research does not exhibit any coloniality.

Table 4. Multicollinearity test results.

Model	Sig.	Collinearity Statistics	
		Tolerance	VIF
(Constant)	,000		
Emotional Intelligence	,004	,929	1,076
Learning Style	,006	,929	1,076

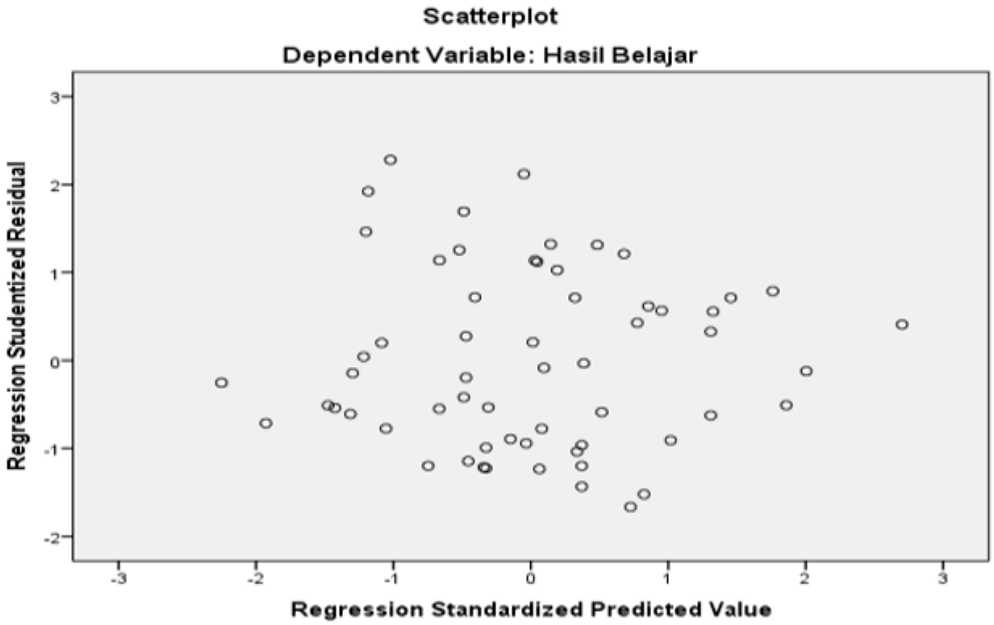

Figure 2. Heteroscedasticity test results.

According to Figure 2, the data points on the plot are randomly distributed and do not exhibit a clear trend. So, the absence of heteroscedasticity was determined.

Table 5. Autocorrelation test results.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,537[a]	,288	,263	4,307	1,872

Table 5 reveals that the Durbin Watson score is 1.872. By comparing this value to the coefficient range (1.6475 < 1.872 < 2.3525), it is obvious that there is no autocorrelation. Furthermore, this research employs multiple linear regression analysis for hypothesis testing. The findings of the multiple linear regression analysis test are summarised in Table 6.

Table 6. Recapitulation of multiple linear regression analysis test results.

Independent Variable	Dependent Variable	Regression coefficient b	t_{count}	t_{table}	Sig.	r^2
Emotional intelligence (X1)	Learning outcomes (Y)	0,349	2,968	1,672	0,004	0,186
Learning styles (X2)	Learning outcomes (Y)	0,393	2,849	1,672	0,006	0,178
Constant: 49.137 F count: 11.532 F table: 3.16 Sig. F : 0.000 R Square: 0.288 α : 0.05						

The Fcount value is 11.532 and the Ftable value is 3.16. Therefore, at a significance level of 0.05, the Fcount value is more than the Ftable value (Fcount > Ftable), resulting in a significant outcome. The p-value of 0.000 is less than the significance level of 0.05, indicating that both emotional intelligence and learning styles have a simultaneous impact on student learning outcomes. The multiple linear analysis yielded a constant value of 49.137. Consequently, there is a positive correlation between a student's emotional intelligence and learning style, and their biology learning outcomes. In addition, the coefficient of determination for emotional intelligence (X1) and learning style (X2) is 0.288. The biology learning outcomes of class XI MIPA students are influenced by a combination of emotional intelligence and learning styles, accounting for 28.8% of the influence. The remaining 71.2% is attributed to additional factors outside emotional intelligence and learning styles.

Students must possess emotional intelligence in order to achieve success in their future professional endeavours (Dewianawati et al., 2022; Octavia et al., 2020). According to Maitrianti (2021), emotional intelligence refers to the capacity to self-motivate and cope with frustration, exercise impulse control and avoid excessive indulgence, manage one's mood, and prevent stress from impairing cognitive abilities, empathy, and concentration. Ningtyas (2016) did a study named "The Impact of Emotional Intelligence and Learning Methods on Social Studies Learning Outcomes for Fifth Grade Students at Ngudi Kawruh Elementary School, Karanglewas Sub-district, Banyumas District." The findings of his study indicated a substantial correlation between emotional intelligence and learning, and the academic performance in social studies of fifth grade pupils at Gugus Ngudi Kawruh Elementary School, located in the Karanglewas District of Banyumas Regency.

According to Goleman (2016) and Permata et al. (2024), emotional intelligence is believed to significantly impact learning achievement. This is because students who struggle to effectively regulate their emotions during the learning process may not be able to optimise their learning potential. Eftafiyana et al. (2018) also asserted that learning styles might exert influence on students' behaviours in attaining objectives, hence affecting the enhancement or advancement of learning outcomes.

The tcount value of 2.968 is more than the ttable value of 1.672, indicating that emotional intelligence has a significant individual effect on student learning outcomes. The variable representing emotional intelligence (X1) has a regression coefficient of 0.349. The coefficient of determination (r^2) for the emotional intelligence variable is 0.186. This suggests that the emotional intelligence factor has a notable impact on the biology learning results of class XI MIPA students at SMA Negeri 4 Jember during the 2022/2023 academic year. There is a positive correlation between emotional intelligence and learning results, meaning that as emotional intelligence increases, so do learning outcomes, and vice versa.

Fauziah (2015) conducted a study titled "The Relationship between Emotional Intelligence and Learning Achievement of Second Semester Students in UIN Ar-

Raniry Counselling". The study found that after analysing data and conducting statistical tests, specifically the Spearman Rank test on 80 second semester students, there was a positive correlation between emotional intelligence and learning achievement. Empirical evidence demonstrates that the p-value is 0.001, leading to the rejection of the null hypothesis (Ho) and acceptance of the alternative hypothesis (Ha) due to the fact that p 0.05. This indicates a substantial correlation between emotional intelligence and learning accomplishment among students in the field of Guidance Counselling. As per Sofyan's (2020) viewpoint, children who possess high cerebral intelligence but lack self-awareness in emotional management and have limited socialisation with their surroundings experience negative impacts on their learning results.

The research findings indicate that the tcount value was 2.849 and the ttable value was 1.672. This suggests that the learning style, as indicated by the tcount being greater than the ttable, had a significant impact on student learning outcomes. The variable representing the learning style (X2) has a regression coefficient of 0.393. The coefficient of determination (r^2) for the learning style variable is 0.178. This suggests that the learning style variable has a notable impact on the biology learning outcomes of class XI MIPA students at SMA Negeri 4 Jember during the 2022/2023 academic year. There is a positive correlation between the extent to which students engage in learning activities that align with their individual learning style and the level of their learning outcomes. Conversely, when students do not align their learning activities with their learning style, their learning outcomes tend to be lower.

Based on the 2018 study titled "The Relationship between Learning Styles and the Achievement Level of Students of the Faculty of Medicine, Islamic University of North Sumatra Class of 2013" conducted by Siska Anggreni Lubis, Mega Dwi Pertiwi, and Saiful Batubara, the data analysis revealed a p value of 0.000, which is less than the significance level of 0.05. Out of the three learning styles, namely visual, auditory, and kinesthetic, the visual learning style had the highest number of students with a very satisfactory GPA, specifically 21 students, accounting for 50.0% of the total. This aligns with the viewpoint expressed by Lubis et al (2018), asserting that favourable learning outcomes are indicative of a well-suited learning style. By identifying and acknowledging one's preferred learning style, the learning process can be optimised for effectiveness.

Effective educators possess the ability to discern the preferred methods of learning for their pupils, as evidenced by research conducted by Hafizha et al. (2022) and Putri et al. (2021). The concept of learning style is a vital factor that varies among individual students (Rahmi & Samsudi, 2020). Hence, a suitable methodology is required during the educational process to ensure pupils comprehend the subject matter effectively. Teachers must possess the capacity to accommodate the diverse learning styles exhibited by each student (Restianim et al., 2020).

CONCLUSION

According to the research carried out in class XI MIPA at SMA Negeri 4 Jember, the following conclusions can be drawn: The combined effect of emotional intelligence and learning style has a notable impact on the biology learning outcomes of class lessons in the academic year 2022/2023. The results of hypothesis testing demonstrate that F_{count} is more than F_{table} (11.532 > 3.16) with a significance level of 0.000, which is smaller than 0.05. It can be inferred that there is a positive correlation between a student's emotional intelligence and learning style, and their biology learning outcomes.

Emotional intelligence and learning styles have a notable impact, to some extent, on the biology learning outcomes of class XI MIPA students at SMA Negeri 4 Jember during the 2022/2023 academic year. The results of the t statistical test indicate that the emotional intelligence variable has a significant effect, as seen by the t_{count} value of 2.968, which is greater than the t_{table} value of 1.672. Additionally, the learning style variable also has a significant effect, with a t_{count} value of 2.849, which is greater than the t_{table} value of 1.672. Both variables have a significance level (sig.) of 0.004 and 0.006 respectively, which is smaller than the threshold of 0.05. It can be inferred that there is a positive individual correlation between a student's emotional intelligence and learning style, and their biology learning outcomes.

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