DIDAKTIKA
JURNAL PEMIKIRAN PENDIDIKAN
http://journal.umg.ac.id/index.php/didaktika
E-ISSN 2621-8941
Vol. 32 No. 1 Tahun 2026 | 13 – 19
DOI: 10.30587/didaktika.v32i1.9595

Analysis of Students' Emotional Intelligence in STEM Based Robotics Learning using Transcript Based Lesson Analysis (TBLA)

Kharisma Nur Kholifah[1], Nova Susanti[2], Neneng Lestari[3]

[1] University of Jambi; Indonesia
[2] University of Jambi; Indonesia
[3] University of Jambi; Indonesia

ARTICLE INFO

Keywords:

Lesson Study;
Robotic;
Emotional;
TBLA

Article history:

Received 2025-10-06
Revised 2026-12-04
Accepted 2026-01-26

ABSTRACT

This study aims to analyze students' emotional intelligence in robotics learning with a STEM approach at Nurul Ilmi Integrated Islamic Junior High School in Jambi. The study used a descriptive quantitative approach with the Lesson Study method analyzed through Transcript-Based Lesson Analysis (TBLA). The results showed that the highest indicators of emotional intelligence were social skills and collaboration abilities (26%–27%) and learning motivation (24%–26%), while the lowest indicator was self-awareness (7%–9%). It was concluded that STEM-based robotics learning was effective in building teamwork and student persistence, but still needed strengthening in the intrapersonal aspect. This study provides a practical contribution for educators in designing holistic STEM learning, which not only hones technical skills but also maps students' emotional dynamics through conversation transcript data during the learning process.

Corresponding Author:
Nova Susanti
Pendidikan Fisika, FKIP, Universitas Jambi, Indonesia e-mail: nova_fisikaunja@unja.ac.id

INTRODUCTION

21st-century learning requires students to possess a variety of skills, not only cognitive but also social and emotional skills, to face the complex and dynamic challenges of life. These skills are a crucial foundation for student success in learning and interacting in social environments. One particularly influential skill is emotional intelligence, the ability to recognize, understand, and manage one's own and others' emotions.

According to (Siti Anisah et al., 2021), emotional intelligence encompasses the ability to accurately perceive emotions, access and manage emotions to support thinking processes, understand and reflect

on emotions, and utilize emotions to enhance cognitive abilities and intellectual growth. Individuals with high emotional intelligence are able to make decisive and accurate decisions, even in stressful situations (Setyaningrum et al., 2016).

This research focuses on junior high school students at Nurul Ilmi Integrated Islamic Junior High School in Jambi. This school environment serves as the backdrop for observations of robotics learning activities that integrate the STEM (Science, Technology, Engineering, and Mathematics) approach. The field of robotics was chosen because it offers practical learning experiences that encourage active student engagement. In these activities, students engage in technical processes such as assembling and programming robots in groups, creating a space for intense social interaction to observe students' non-cognitive aspects.

One learning method that has the potential to develop 21st-century skills and train students' emotional intelligence is robotics. The field of robotics attracts students' attention because it offers a practical and enjoyable learning experience and encourages active engagement. According to (Asri, 2018), robotics can serve as a unique and highly engaging learning medium for students. Furthermore, (Rifudin et al., 2022) state that robotics is an effective learning tool in project-based learning models, which integrate STEM approaches and technical skills into a single learning project. The STEM (Science, Technology, Engineering, and Mathematics) approach is an integrative and applicable learning method that integrates concepts from science, technology, engineering, and mathematics into real-life contexts. However, in practice, non-cognitive aspects such as emotional intelligence are still not a primary focus in the learning process, especially in technical learning.

While the importance of emotional intelligence has been widely discussed, there is a gap in its observation methods, particularly in STEM-based technical learning. Most learning evaluations still focus on academic outcomes, and observations of emotions are often general in nature without detailed supporting data. This research aims to fill this gap by using a Transcript-Based Lesson Analysis (TBLA) approach within a Lesson Study framework. Unlike traditional observation, TBLA provides authentic and contextual data through transcripts of real-life student conversations. This allows researchers to more accurately map the dynamics of students' emotions, self-management, and empathy as they interact to solve robotics challenges.

According to (Latip, 2020), the goal of the STEM approach is to develop students' skills to prepare them for the challenges of the global workforce. (Rahmaniar & Latief, 2021) added that STEM learning elaborates scientific concepts and principles to produce useful products, processes, or systems. In the context of robotics activities, students not only engage in critical and technical thinking processes when assembling and programming robots, but also learn to cooperate, collaborate, and actively interact socially, all of which have the potential to reflect aspects of emotional intelligence.

Based on the description above, the purpose of this study is to analyze the dynamics of students' emotional intelligence in robotics learning using a STEM approach through transcript data. In an operational context, the emotional intelligence discussed refers to five main indicators: the ability to recognize one's own emotions, manage them, motivate oneself, show empathy, and build positive social relationships (Djoko Hari Supriyanto, 2021). These five indicators were identified through a content analysis of transcripts of student interactions during the learning process. This research is expected to provide practical contributions for teachers in designing more holistic learning, emphasizing not only academic aspects but also students' social-emotional development.

METHODS

This study uses a descriptive quantitative approach. According to (Creswell, 2018) , a quantitative approach is a systematic method for testing theories or answering research questions objectively by analyzing the relationship between variables through numerical data. This approach allows researchers to measure and evaluate the variables under study statistically and objectively. In this study, a quantitative approach was used to analyze students' emotional intelligence levels based on five main indicators in accordance with the dimensions and indicators of emotional intelligence described by (Lisnawati, 2019) namely intrapersonal, self-regulation, motivation, interpersonal, and self-adjustment. Emotional intelligence indicators. The emotional intelligence instrument was calculated for reliability using the Cronbach's Alpha formula, with a coefficient of 0.783.

The research sample consisted of 20 students in class 7b at SMPIT Nurul Ilmi Jambi who participated in robotics learning. Data were collected through recording the learning process, which was then transcribed and analyzed using the transcript-based lesson analysis (TBLA) method. The transcript data were coded and categorized into each emotional intelligence indicator, which were then analyzed quantitatively through the frequency of occurrence and intensity of indicators in the context of student interactions. The instruments for the students' emotional intelligence indicators can be seen in Table 1.

Table 1. Student Emotional Intelligence Indicators

No	Indicator	Description
1	Intraprational	students recognize the emotions they feel when facing difficulties or successes in learning
2	Self Regulation	students are able to control their emotions when faced with frustration, mistakes, or changes in plans
3	Motivation	students show enthusiasm for completing tasks despite obstacles.
4	Interpersonal	students show concern or respond to the feelings of friends who are experiencing difficulties.
5	Self adjustment	students are able to work together, listen to opinions, and contribute to the team

(Lisnawati, 2019)

FINDINGS AND DISCUSSION

This study shows the emotional intelligence of students as demonstrated in the robotic learning process that was carried out. When working in groups, students exhibited several behaviors that met the indicators of emotional intelligence. According to (Wahidin et al., 2019) emotional intelligence is defined as the ability to identify emotions, access and trigger emotions to support thinking processes, understand emotions and their implications, and comprehensively regulate emotions, which ultimately facilitates emotional and intellectual growth. In the implementation of robotics learning, students will interact and collaborate so that the emotional intelligence that arises during the learning process is analyzed.

Findings

The analysis presented in this study includes an analysis of respondent characteristics and the number of students participating in robotics education. The discussion of each analysis is as follows:

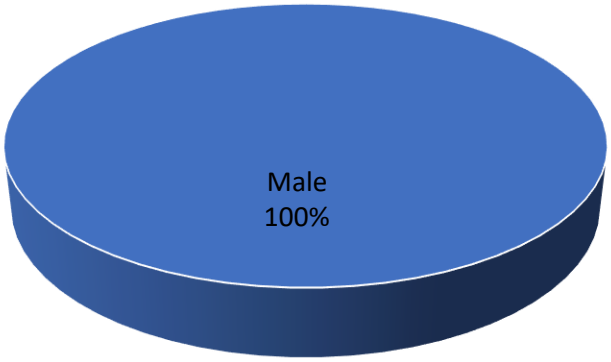

Figure 1. Characteristics of respondents based on gender

Figure 1 above shows the gender data of the research sample. The sample consisted of a number of males who participated in robotics learning with a percentage of 100%. This shows that robotics learning activities in this school are still dominated by male students. This phenomenon may reflect a tendency for male students to have a higher interest or participation in technology and engineering, which are the main components of robotics-based learning.

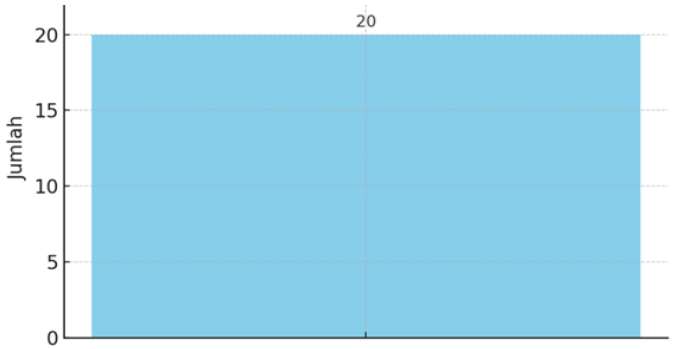

Figure 2. Number of students participating in robotics education

Figure 2 shows a diagram of the number of students participating in robotics classes, which consists of 20 male students. This data confirms that student involvement in robotics activities at this school is still limited to certain groups. This could be due to several factors, one of which is gender perceptions of technology.

Table 2. Results of students' emotional intelligence analysis

No	Indicator	Group 1	Group 2	Group 3	Group 4
1	students recognize the emotions they feel when facing	9%	7%	7%	6%

	difficulties or successes in learning				
2	students are able to control their emotions when faced with frustration, mistakes, or changes in plans	18%	16%	17%	17%
3	students show enthusiasm for completing tasks despite obstacles.	26%	25%	24%	26%
4	students show concern or respond to the feelings of friends who are experiencing difficulties.	21%	22%	21%	20%
5	students are able to work together, listen to opinions, and contribute to the team	26%	25%	27%	27%

Discussion

This study analyzes students' emotional intelligence through robotics learning using the Lesson Study approach. Lesson Study is applied as a method to evaluate and improve the learning process (Aini et al., 2024) And according to (Pulsande, 2021), it states that improving the quality of Lesson Study can be achieved through in-depth analysis of the learning process, which includes observation, recording, and transcription of learning outcomes for analysis. In this study, the analysis was conducted using Transcript-Based Lesson Analysis obtained from audio recordings during the learning process. The use of Transcription-Based Lesson Analysis (TBLA) in learning analysis is considered effective because it allows for an in-depth study of verbal interactions between teachers and students during the learning process (Anggraini et al., 2024). Transcript-Based Lesson Analysis (TBLA) analysis is one way to detect learning difficulties experienced by students in order to achieve effective learning goals (Masniari et al., 2023).

Based on the analysis of students' emotional intelligence, the highest score was found in the fifth indicator, namely the ability to work together and social skills, with a percentage of 26%–27% across all learning groups. This indicates that robotics learning can develop students' socio-emotional aspects, particularly in the context of collaboration and interaction between peers. This finding aligns with research results (Masban, 2022), which states that a STEM-based learning approach can improve students' abilities to discuss, respond to questions, and complete tasks collaboratively. Furthermore, (Hanik & Ulfa, 2021) also revealed that in robotics learning, students are actively involved cognitively, affectively, and emotionally. This active involvement encourages a deeper understanding of the material and strengthens students' social interaction skills.

Another indicator that also showed a high score was the third indicator, namely "Showing enthusiasm to complete tasks despite facing obstacles," with a percentage of 24%–26%. This indicates that robotics learning plays a role in increasing student learning motivation. Direct student involvement in practical activities such as assembling robots is a significant motivating factor. (Riantoni et al., 2023) stated that providing real-life experiences in the learning process can increase student motivation and active participation. Observations during the learning process support this, where students demonstrated high enthusiasm and persistence in completing projects despite facing various

technical challenges. Collaboration between students was also seen strongly in efforts to complete tasks together.

Further analysis of emotional intelligence based on transcripts of student conversations during learning shows a varied distribution of emotional scores according to the indicators. The lowest score was found in the first indicator, namely "Recognizing emotions being felt when facing difficulties or success," with a percentage of only 7%–9%. This finding indicates that most students still have difficulty recognizing and realizing personal emotions that arise during the learning process. This lack of emotional self-awareness can be a concern in the development of future learning programs, particularly those related to strengthening students' intrapersonal aspects. The analysis of students' emotional intelligence is also visualized in the form of a graph of students' emotional responses per group. The learning activity was carried out by 20 students and divided into four groups. It shows a variety of emotions. Based on the graph above, high percentages are shown in the third and fifth indicators, namely, self-awareness and social skills.

This emphasizes that although collaboration and motivation are rapidly developing through STEM-based robotics learning, strengthening the emotional self-awareness aspect still requires further attention to ensure a more holistic development of students' emotional intelligence. As stated by (Selvia et al., 2024), transcript-based analysis is a highly effective tool for detecting learning difficulties and often-unseen details of student interactions, leading to more effective and meaningful learning objectives.

CONCLUSION

This study concludes that robotics learning using the STEM approach at SMPIT Nurul Ilmi Jambi is effective in developing students' emotional intelligence, particularly in terms of social and collaboration skills, as well as learning motivation. Through lesson study and Transcript-Based Lesson Analysis (TBLA), it was found that interactions during robot assembly and programming encouraged students to work together in teams and persevere in the face of technical obstacles. However, the analysis results showed the lowest scores on the self-awareness indicator, indicating that students still have difficulty recognizing and understanding their personal emotions during the learning process. Theoretically, this study proves that TBLA is an accurate instrument for mapping emotional dynamics through authentic conversation data. Practically, teachers are advised to strengthen students' intrapersonal aspects through self-reflection so that the development of emotional intelligence becomes more holistic and balanced.

REFERENCES

Aini, N., Susanti, N., & Nurhatmi, J. (2024). Penelitian Kualitatif dalam Pembelajaran Lesson Study pada Mata Kuliah Perubahan Iklim Berbasis NVivo Pendahuluan. *Jurnal Pembelajaran Fisika*, *13*(4), 200–210. https://doi.org/10.19184/jpf.v13i3.48554

Anggraini, C. N., Susanti, N., Dani, R., & Maryanti, I. (2024). Analisis Kesesuaian Proses Pembelajaran Fisika dengan RPP Pada Materi Fluida Statis Di MAS Laboratorium Melalui Pengamatan Video Pembelajaran Menggunakan TBLA. *Jurnal Pemikiran Pendidikan*, *30*(1), 48–57. https://doi.org/10.30587/didaktika.v30i1.6923

Asri, Y. N. (2018). Pembelajaran Berbasis Stem Melalui Pelatihan Robotika. *WaPFi (Wahana Pendidikan Fisika)*, *3*(2), 74. https://doi.org/10.17509/wapfi.v3i2.13735

Creswell, J. W. (2018). Qualitative, Quantitative, and Mixed Methods Approaches. In *Writing Center Talk over Time*. https://doi.org/10.4324/9780429469237-3

Djoko Hari Supriyanto. (2021). Analisis Pengaruh Kecerdasan Emosional Terhadap Proses Berfikir

Siswa Kelas IV dalam Memecahkan Masalah Matematika. *Jurnal Pendidikan Modern*, *6*(2), 85–90. https://doi.org/10.37471/jpm.v6i2.208

Hanik, E. U., & Ulfa, M. (2021). Pembelajaran Berbasis Stem Melalui Media Robotik Untuk Meningkatkan Keterampilan Siswa Abad 21 Sekolah Indonesia Kuala Lumpur (Sikl). *International Conference on Islamic Education*, *1*, 83–96.

Latip, A. (2020). Minat Belajar Peserta Didik SMP Pada Pembelajaran STEM dengan Media Robot Edukasi. *Jurnal Literasi Pendidikan Fisika*, *1*(02), 90–96. https://doi.org/10.30872/jlpf.v1i2.353

Lisnawati, S. (2019). Development of Emotional Quotient Instrument. *Jurnal Evaluasi Pendidikan*, *2*(1), 54. https://doi.org/10.21009/jep.021.05

Masban, B. R. (2022). Pengaruh Pembelajaran Berbasis Stem Terhadap Pemahaman Konsep Dan Kemampuan Bekerjasama Peserta Didik Pada Materi Elektroplating Di Sma Negeri 1 Sakra. *Indonesian Journal of Teacher Education*, *3*(1), 352–361.

Masniari, D., Susanti, N., Lestari, N., & Gustria, A. (2023). Describing Student Activeness Using Transcript Based Lesson Analysis In Lesson Study Material Hydrostatic Pressure And Pascal's Law. *DIDAKTIKA : Jurnal Pemikiran Pendidikan*, *29*(2), 152. https://doi.org/10.30587/didaktika.v29i2.5438

Pulsande, A. S. (2021). Analisis Pembelajaran Ipa Dengan Lesson Study Berbasis Transcript Based Lesson Analysis Pada Materi Getaran Dan Gelombang. *Jurnal Sains Dan Pendidikan Fisika*, *17*(2), 128–138.

Rahmaniar, A., & Latief, A. (2021). Analisis Literatur Teknologi dalam Integrasi Pendidikan STEM pada Pembelajaran IPA. *Jurnal Literasi Pendidikan Fisika (JLPF)*, *2*(2), 143–148. https://doi.org/10.30872/jlpf.v2i2.680

Riantoni, C., Fuady, S., Hais, Y. R., & Novallyan, D. (2023). Workshop STEM Robotik Bagi Siswa dan Guru di SMPN 32 Muaro Jambi STEM Robotics Workshop for Students and Teachers at SMPN 32 Muaro Jambi. *Jurnal Anugerah*, *5*(x), 61–72.

Rifudin, R., Setiawan, A., Abidin, Z., Efrilianda, D. A., & Jumanto. (2022). Pembelajaran STEM Berbasis Robotika Sederhana Bagi Guru Sekolah Dasar di Karimunjawa. *Abdimasku : Jurnal Pengabdian Masyarakat*, *5*(3), 570. https://doi.org/10.33633/ja.v5i3.825

Selvia, Susanti, N., Alrizal, & Khoiriyah. (2024). Identifikasi Kemandirian Belajar Siswa di Ma Nurul Islam Lumajang Pada Materi Fluida Dinamis Melalui Pengamatan Video Berbasis TBLA. *Didaktika Jurnal Pemikiran Pendidikan*, *30*(1), 34–47. https://doi.org/10.30587/didaktika.v30i1.6921

Setyaningrum, R., Utami, H. N., & Ruhana, I. (2016). Pengaruh Kecerdasaan Emosional Terhadap Kinerja. *Jurnal Administrasi Bisnis (JAB)|Vol*, *36*(1), 211–220.

Siti Anisah, A., Katmajaya, S., & Zakiyyah, W. L. (2021). Pengaruh Kecerdasan Emosional Terhadap Sikap Sosial Pada Siswa Sekolah Dasar. *Jurnal Pendidikan UNIGA*, *15*(1), 434. https://doi.org/10.52434/jp.v15i1.1178

Wahidin, M. S., Darsono, & Astuti, N. (2019). Hubungan Pendidikan Karakter dan Kecedasan Emosional dengan Hasil Belajar PKn. *Pedagogi: Jurnal Pendidikan Dasar*, *7*(13).