Vidya Karya
https://ppjp.ulm.ac.id/journal/index.php/jvk
e-ISSN: 2614-7149 p-ISSN: 0215-9619
Vol 41 No 1 2026
DOI: https://doi.org/10.20527/jvk.v41i1.25549

Emotional Intelligence and Its Impact on Students' Science Learning: A Systematic Literature Review

Kamaluddin[1,2*], I Ketut Suma[1], Ni Ketut Rapi[1], I Wayan Suastra[1], Edi Firmansyah[2], and Sofyan Syamratulangi[2]
[1]Science Education, Postgraduate Program, Ganesha University of Education, Bali, Indonesia
[2]PGSD, STKIP Al-Amin, Dompu, Indonesia
*kamalphysic20@gmail.com

Article Info

Article history:
Received: February 18, 2026
Accepted: April 11, 2026
Published: April 29, 2026

Keywords:
Emotional intelligence
PRISMA
Science learning
Students
Systematic literature review

This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

© 2026 Vidya Karya

Abstract

Emotional intelligence has become an important component that influences how well students succeed in learning, including in science. The purpose of this study specifically focuses on the role of emotional intelligence in the context of science learning. This article is a systematic literature review that investigates the relationship between emotional intelligence and science learning. PRISMA guidelines were used in this study to review empirical articles published from 2015 to 2024. In total, 22 articles met the criteria for the systematic literature review. Emotional intelligence acts as an essential basis that connects the emotional side of scientific learning to its cognitive side. Emotional intelligence not only aids in increasing engagement but is also beneficial for enhancing conceptual understanding and can thus be used effectively during the learning process. Studies show that emotional intelligence significantly improves student engagement, critical thinking, and learning outcomes in science learning. This article also discusses the mechanisms of these relationships and suggests ways emotional intelligence can be used in science education.

To cite this article: Kamaluddin, K., Suma, I. K., Rapi, N. K., Suastra, I. W., Firmansyah, E., & Syamratulangi, S. (2026). Emotional intelligence and its impact on students' science learning: A systematic literature review**.** *Vidya Karya*, *41*(1), 203-221.

INTRODUCTION

The focus of education in the 21st century is to produce teachers who can develop the potential of each child through practice (Pařízek, 2021). Non-cognitive skills, which include various traits, such as emotional intelligence, resilience, social skills, and motivation, are essential for personal and professional development. Modern education increasingly recognizes how important both cognitive abilities and non-cognitive skills are for one's success in everyday life. Rigor and emotional stability have been linked to higher grades and better job opportunities; this suggests that emotional and cognitive abilities are equally important for success (Brunello & Schlotter, 2021; Hernández & Hershaff, 2015). Furthermore, collaborative projects, role-playing exercises, and community service programs can improve students' empathy, teamwork, and leadership abilities (Wakit et al., 2024; Watanabe, 2019). These elements are packaged by Goleman (Alfaruqy, 2023) into a concept he calls emotional intelligence.

According to Salovery and Mayer Aziz et al. (2020), emotional intelligence will affect student achievement and performance both positively and negatively in their learning experience, which is worrying. Emotional intelligence is a basic capital for students to welcome the future because with emotional intelligence, a person will succeed in facing

various challenges, including challenges to succeed academically (Sholina & Dwi, 2019). In the learning process, emotional intelligence affects how students understand, interact, and adapt to the subject matter and the learning environment (Cahyaningtiyas, 2022; Ilmi & Damayanti, 2020). Emotional intelligence consists of several components, including self-awareness, emotion management, self-motivation, empathy, and social skills (Putra & Darmawan, 2022; Fajar, 2023; Rivana, 2019; Kurniady, 2023).

Emotional intelligence is increasingly recognized as an important component in education because it helps students in facing academic challenges, especially in challenging fields such as science. When students can manage emotions and stress effectively, they are more likely to concentrate on their studies and face challenges (Bagum et al., 2023; Pashchenko et al., 2024). Learning processes that foster self-awareness, empathy, and emotion regulation will give a congenial learning environment, which shall result in academic and personal progress among the learners (Ayeni et al., 2024; Lansigan, 2021).

Science learning requires emotional regulation, collaboration, and resilience. It was about exploration, problem-solving, and evidence-based decision-making. Having to deal with complex problems that usually do not have an immediate solution is an important aspect of good science learning (Abdillah et al., 2021; Devi et al., 2024). Thus, students have to present data analysis, evaluate the evidence, and make creative use of knowledge to design solutions. Communication and interaction skills in cooperation can be a basis for strengthening the progress that every human will experience in his life (Li et al., 2021; Lin et al., 2019). Science learning engagement from students, better concept understanding, and critical thinking can be influenced by emotional intelligence itself (MacCann et al., 2020; Quílez-Robres et al., 2023).

Research shows that students with low emotional intelligence tend to have poor academic performance and show negative attitudes towards learning (Sánchez-Álvarez et al., 2020; Supriyadi, 2023). This is because low emotional intelligence can inhibit students' ability to manage their emotions, leading to decreased motivation, increased stress, and decreased focus (Acoci et al., 2022). In addition, low emotional intelligence can lead to decreased social, empathy, and communication skills, all of which are essential for effective collaboration and teamwork in an academic setting (Daulay, 2022). Because emotional intelligence is defined as the ability to feel, use, understand, manage, and handle emotions (Khatoon et al., 2020; Suleman et al., 2019).

This study specifically focuses on the role of emotional intelligence in the context of science learning, namely, (1) highlighting how emotional intelligence contributes to the science learning process that requires emotional involvement, problem-solving, and critical thinking. The involvement of emotional intelligence is crucial in science learning, enabling students to recognize their emotions and transform them from negative to positive during the inquiry process (Tea & Ovid, 2024). High emotional intelligence can facilitate self-regulation, an important factor in evaluating evidence and hypotheses (Guzman, 2025). (2) Not only examining the relationship between emotional intelligence and learning outcomes, but also analyzing its mechanisms of influence on learning engagement, understanding of science concepts, and its integration into science learning strategies. Emotional intelligence enhances student engagement by helping them manage stress and maintain focus during challenging science tasks (Akter et al., 2025; Chen, 2022). Generally, science curricula do not typically address the affective domain, which leads to the development of negative emotions toward the natural sciences. For example, students often feel frustrated by failed experiments, yet conventional approaches do not help them build resilience. This gap hinders deep conceptual understanding, as emotions interact with symbolic learning and learning through direct experience (Brígido Mero et al., 2024; King et al., 2025; Kutluk et al., 2025).

This study aims to identify how emotional intelligence affects student engagement in science learning, understand the relationship between emotional

intelligence and science concept understanding, and explore various strategies for integrating emotional intelligence into the science learning process. However, despite strong evidence of the benefits of emotional intelligence in education, research linking emotional intelligence specifically to science learning remains relatively limited. Consequently, this review incorporates recent research looking at the impact of emotional intelligence on science learning processes and outcomes. The following questions are addressed in this systematic literature review:

1. How does emotional intelligence affect student engagement in science learning?
2. What causes emotional intelligence to relate to science concept understanding?
3. How can emotional intelligence be used to teach science?

METHODS

The research method to be used is a systematic literature review (SLR). An SLR identifies, selects, and critically evaluates studies to answer the research questions that have been formulated (Kitchenham & Charters, 2007). A systematic review is based on a clearly defined plan. The criteria are clearly established before the review process begins. The implementation of the systematic review is based on the development of a holistic search strategy. This review is conducted in accordance with the PRISMA guidelines. These guidelines include the development of search sources, development of eligibility criteria, development of inclusion and exclusion criteria, development of the systematic review process, data extraction from existing literature, and data analysis (Azril et al., 2018). This review identifies all types of information regarding indicators of creative thinking reported over the past 10 years.

Search Strategy

This study conducted a comprehensive systematic search, and relevant scientific journals discussing the relationship between the influence of emotional intelligence on students and science learning were successfully identified. The articles were identified using a combination of keywords, employing the logical operators “AND” and “OR.” The keywords used to search for articles were as follows: emotional intelligence OR emotional OR social-emotional AND science learning OR “learning.” Additionally, filters were applied to identify articles published in English and containing information on student learning, ensuring the articles were relevant and specific. The search strategy also involved data selection, with articles drawn from the years 2015–2024. To clarify the use of the inclusion and exclusion criteria established in this systematic review, they are presented in Table 1.

Table 1 Inclusion and exclusion criteria

Criteria	Description
. Inclusion	1. The data used are journal articles for the last 10 years (ten) years from 2015-2024
	2. Data were taken from Sinta-accredited journals, international journals, Google Scholar, Scopus, etc.
	3. Data describes emotional intelligence and science learning
Exclusion	1. Data does not contain complete emotional intelligence and science learning
	2. Data does not discuss how to bring up or improve emotional intelligence and science learning

(Wahono, 2015)

Based on the objects and inclusion and exclusion criteria described above, 1000 articles were identified in this study. The identified articles would undergo several processes according to the PRISMA diagram, which consists of 10 main stages, including

identification, screening, eligibility, and inclusion. As for the PRISMA diagram, one can refer to Figure 1.

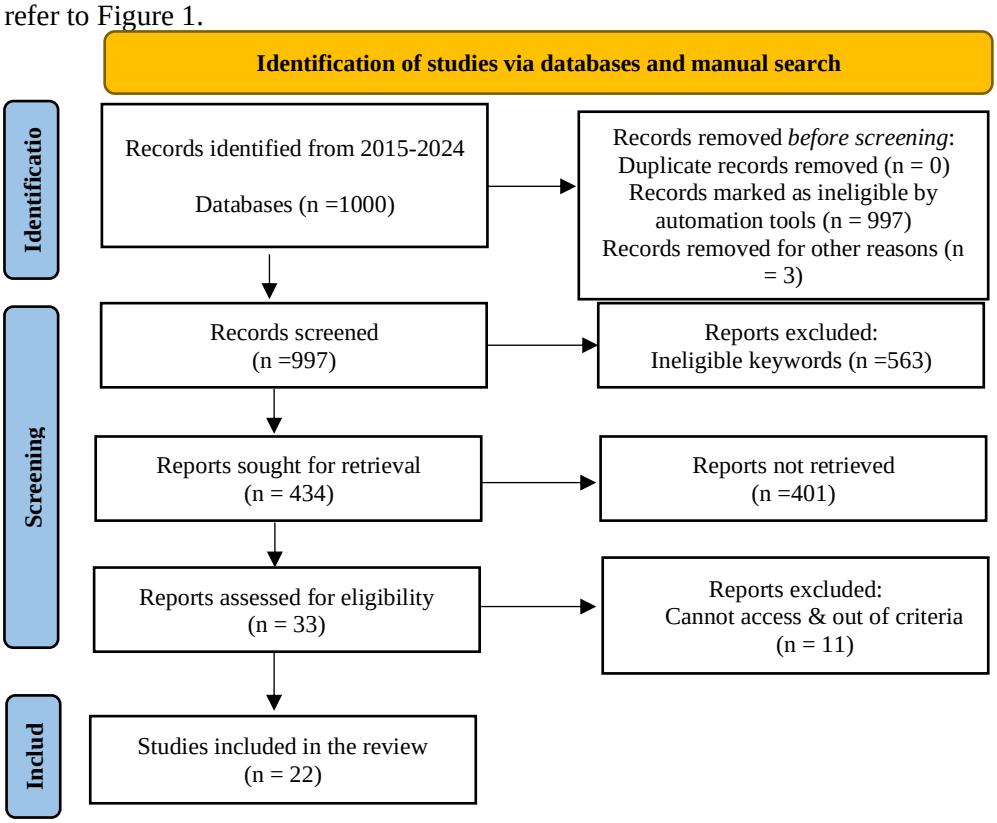

Figure 1 PRISMA flow diagram

Study Selection

Articles retrieved from the database were then independently reviewed by the authors. The first stage of this process involved an initial screening of articles based on their titles according to eligibility criteria. The second stage involved screening the abstracts of the selected articles, followed by the third stage, which involved screening the full-text articles. After the screening of the full-text articles was completed, the findings from these articles were compared by the authors to see if any differences were observed. If differences were observed, they were resolved through discussion. In cases of disagreement, the supervisor's opinion was sought to resolve the issue impartially. Articles excluded from the study, along with the final list of articles, are included, along with the reasons for their exclusion.

Data Collection and Management

The extracted data were then categorized based on the following parameters: the first author's last name, year of publication, country where the research was conducted, study design, emotional intelligence variables, and variables related to science learning. To ensure accuracy and eliminate redundancy, the extracted data were reviewed twice. This was done to ensure accuracy and eliminate redundancy. Any incomplete data was identified, and the most complete data was selected. Data cleaning was performed to ensure that the extracted data met the required standards. Any ambiguous data was clarified either by referring to the original article or by contacting the original author.

RESULTS AND DISCUSSION

Emotional Intelligence in Education

Emotional intelligence significantly impacts student learning outcomes in an educational setting. Emotional intelligence involves the ability to sense, understand, and handle one's own and others' emotions. Emotional intelligence is increasingly recognized as a determinant of student achievement. Emotional intelligence has been shown to predict high school and college achievement, in that students with higher emotional intelligence tend to perform better academically (Juyal et al., 2023; Radu et al., 2024). The main characteristics of emotional intelligence include self-awareness, self-regulation, motivation, empathy, and social skills. These traits enable students to navigate social complexity, manage stress effectively, and maintain motivation, all of which contribute positively to their academic endeavors (Pradhan & Jena, 2024).

Emotional intelligence is a key resource in developing a student's learning process that affects engagement, motivation, and overall academic performance. Students with high emotional intelligence show more motivation and engagement in their learning process (Aljasir, 2024). A study involving secondary school students showed that with higher emotional intelligence, the motivation to learn increased (Suswandi et al., 2023). Although motivation does not directly influence learning outcomes, this initial spark of emotional intelligence creates an environment that enables better learning and, therefore, higher performance.

The application of emotional intelligence is not only about cognitive development but also about the non-cognitive development of students. Students with high emotional intelligence are better equipped to navigate social interactions, resolve conflicts, and work collaboratively with others. These attributes have been increasingly recognized as important components of success in personal and professional fields (Zixiang et al., 2023). Emotional intelligence thus significantly influences students' self-efficacy or belief in their capability to be successful in a situation. It is also particularly relevant to educational contexts where much learning takes place through student teamwork and collaboration (Grewal & Ganguly, 2019; Tomory, 2023).

Relationship between Emotional Intelligence in Science Learning

Science education has cognitive and affective dimensions, hence putting much emphasis on emotional intelligence in addition to knowledge of the subject. These educators often harbor negative emotions and beliefs about the teaching of science compared to other subjects. However, targeted emotional training improved their attitudes and emotional responses to science education, suggesting that addressing emotional aspects can improve teaching effectiveness (Mero et al., 2024). For students, prior knowledge, achievement goals, and emotional experiences are related to their possibility of experiencing conceptual change; for this reason, an integrated approach is needed, taking into consideration cognitive understanding and emotional involvement (Mason, 2020). For this reason, future teachers report improvements not only in cognitive knowledge but also in emotional and relational aspects when engaging with the natural environment. This approach underscores the potential of experiential learning to foster cognitive skills and emotional intelligence in science education (Eugenio-Gozalbo et al., 2019).

Emotional intelligence significantly contributes to increasing student motivation, particularly when facing challenges in experiments that go wrong or when not easily understanding abstract concepts of science. Students with high emotional intelligence can handle mistakes during the experiment or misunderstandings of complicated topics more appropriately. In this way, students remain motivated on their journey of learning despite challenges (Jepps et al., 2022; Stella et al., 2023). With high emotional intelligence, students usually perform even better due to better motivation and a deeper dive into the subject of the study. Hence, embedding emotional intelligence training into the academic

routine is very essential for an overall improvement in performance by school-going students (Kristiawan et al., 2020; Suswandi et al., 2023).

Science learning is increasingly recognized as a complex process that requires critical thinking, teamwork, and data-driven decision-making. These abilities are essential for understanding scientific concepts, and emotional intelligence is strongly influenced by these abilities. A study involving accounting students found that those with greater emotional intelligence showed better critical thinking skills during learning activities (Sulastri et al., 2023). Furthermore, using an environment where students can cooperate and communicate well while managing their emotions while working on group assignments (Purwanto, 2023; Verawati & Sarjan, 2023).

The articles used in the Systematic Literature Review (SLR) span the last 10 years, from 2015 to 2024. There are 1000 articles following the keywords of emotional intelligence skills and science learning, according to the results of article searches using Sinta-accredited journal databases, international journals, Google Scholar, Scopus, etc. The articles evaluated were from national and international journals. A total of 22 articles were evaluated from national and international journal sources, and the SLR results of the articles are presented in Table 2.

Table 2 Articles included in the Systematic Literature Review (SLR)

No.	Author (Year)	Level	Regional	Finding
1	Pursitasari et al. (2015)	Middle school	Indonesia	Statistical tests indicate that students' posttest scores were significantly higher than their pretest scores, thus demonstrating that the thematic-based integrated science learning model is effective in improving science learning outcomes.
2	Amirian & Behshad (2016)	High School	Iran	The results of the analysis indicate a significant positive correlation between teachers' emotional intelligence and self-efficacy, with a correlation coefficient of $r = 0.67$ ($p < 0.001$). This means that the ability to manage emotions plays a crucial role in enhancing teachers' confidence in their ability to teach effectively.
3	Leasa et al. (2017)	Primary School	Indonesia	The results of the study indicate that learning style has a significant effect on students' emotional intelligence, with a significance level of $0.000 < 0.05$. This means that students' emotional intelligence differs significantly based on their learning style
4	Kurniawati (2017)	Middle school	Indonesia	The results of the study indicate that the use of comics based on local wisdom from Jember as integrated science teaching materials has proven effective in improving student learning outcomes. These findings suggest that teaching materials based on comics and local wisdom can help students better understand the subject matter.
5	Vargha & Chidanand (2018)	Primary School	India	The results of the study indicate that there is no significant difference in emotional intelligence between male and female students. This suggests that the levels of emotional intelligence among male and female students are relatively similar.
6	Saido et al. (2015)	Middle school	Malaysia	Based on the results of students' level of higher-order thinking skills, the study provided evidence that almost all students need to improve their higher-order thinking skills, especially the

No.	Author (Year)	Level	Regional	Finding
				synthesis and evaluation skills required for improving students' creativity in science.
7	Luy-Montejo (2019)	University	Peru	The results showed that there was a significant influence of the PBL on the development of the emotional intelligence of the students in the study.
8	Sutiani et al. (2021)	Primary School	Indonesia	The results showed that a standard inquiry learning model with science literacy has been developed for the Chemical kinetics topic, where the feasibility is categorized to be very good (M = 3.60±0.06).
9	Ngui & Lay (2020)	University	Malaysia	Findings showed that emotional intelligence, self-efficacy, and subjective well-being were able to explain resilience with good predictive accuracy and relevance, but poorly for practicum stress.
10	Rauf et al., (2020)	High School	Indonesia	The results of the research show that there is an influence of Emotional Intelligence and Learning Behavior on Motivation, with a t-count of 5,912, Emotional Intelligence on Motivation and Learning Behavior, with a bear t-count of 4.408. It is known that emotional intelligence and learning behavior affect learning motivation.
11	Darling-hammond et al. (2020)	High School	Amerika	Analyses of ambitious, integrated approaches to education at the school, district, state, and national levels have shown that with intensive preparation, purposeful curriculum systems, and equitable resources, educators can create supportive environments for children and youth that enable healthy development and powerful learning, even for those who experience the adverse effects of poverty
12	Rahmania (2021)	Middle school	Indonesia	The results of the study show that some basic competencies at the junior secondary school level in science learning can be integrated with the STEM approach in the form of activities to familiarize the STEM approach in the classroom and the provision of projects to students.
13	Suswandi et al. (2023)	Middle school	Indonesia	This study sheds light on the significance of Emotional Intelligence in fostering Learning Motivation and subsequently impacting academic performance in Economics among high school students
14	Arias et al. (2022)	Primary School	Spanyol	The results maintain a mid to high level of EI in all of the factors (self-conscience, self-control, emotional use, empathy and social skills) and a good level of academic motivation. Therefore, they show a positive and significant correlation between the two variables. Girls have a higher emotional intelligence index, and there is no difference in academic motivation in terms of gender. Based on these results, it is suggested to implement programs that consolidate emotional competencies given their importance in the psychoevolutionary development of students and their relationship with academic motivation.

No.	Author (Year)	Level	Regional	Finding
15	Tea & Ovid (2024)	University	Amerika	In alignment with our collective effort to support student well-being in the life sciences, the study of Emotional Intelligence in undergraduate biology education has the potential to support student mental health as future scientists and health care practitioners.
16	Gerard et al. (2022)	High School	Amerika	Based on interviews and logged data, we illustrate how teachers' use of OER starkly differed from the typical uses of technology for transmitting information or increasing productivity. These experiences provide insights into ways teachers and professional developers can take advantage of OER to promote self-directed learning when in-person instruction resumes.
17	Boccaccio et al. (2023)	University	Italia	This study unveils the intricate dynamics of emotion recognition, gender, occupation, level of education, and emotional intelligence. By incorporating these insights into educational programs, a transformative process can be initiated, nurturing not only empathy, cultural insight, and emotional intelligence but also catalyzing the evolution toward inclusive and emotionally equipped societies.
18	Krajcik et al. (2022)	High School	Amerika	Results show that students who received the intervention had higher scores on a standardized science test (0.277standard deviation) and reportedhigherlev- els ofself-reflection and collaboration when involved in science activities.
19	Prananda et al. (2023)	Middle school	Indonesia	The results of this research can be seen from the results of the hypothesis test using the t-test, which was carried out, so that the value of t_count=0 and t_table= 2.02 was obtained. From the distributed table t, we get ttable = 2.02. So, it can be concluded that t_count > t_tabel, where 0 > 2.02, thus the working hypothesis H_1 is accepted, meaning there are significant differences in learning outcomes in the two samples. This
20	Raven & Wenner (2023)	University	Amerika	From these findings, we put forward the Integrated Preschool Science Framework that can be used by researchers and teacher educators to think more deeply about how placing science at the center of preschoolers' learning can provide rich opportunities for supporting preschools in multiple learning domains.
21	Nieto et al. (2024)	University	Spanyol	These results show the benefits of being emotionally intelligent since it mitigates the negative consequences of negative emotions, stressing the need to teach emotional skills or promote EI in educational and cognitive contexts
22	Džafić & Ilić, (2024)	Primary School	Serbia	The study underscores the importance of integrating emotional intelligence programs into the educational system to promote the integral development of teachers and students.

The process review in this study involved findings based on three different research questions, each presented separately below.

1. Emotional intelligence affects student engagement in science learning

To improve students' science learning outcomes, understanding the relationship between emotional intelligence and managing negative emotions is crucial, especially as science learning often involves exploration, problem-solving, and decision-making activities that can be stressful and frustrating. Students with high emotional intelligence are usually better equipped to handle these negative emotions, such as confusion and anxiety. Epistemic emotions, which include curiosity, confusion, anxiety, and frustration, are critical in science education, as they can significantly affect learning outcomes (Meti et al., 2022; Sen et al., 2022; Vilhunen et al., 2022). Improved learning quality can occur if students understand social intelligence, emotional intelligence, and interpersonal communication well in the learning process. This understanding helps students identify problems experienced during the learning process (Warneri et al., 2023). Developing emotional intelligence is necessary in today's digital era, where interpersonal interactions are diminishing (Rogulska et al., 2023). Emotional intelligence is essential in the teaching-learning process, especially in the online environment. It helps in achieving communication goals and obtaining feedback that matches the communicative intent (Claudia-Raluca Stamatescu, 2022)

Emotional Intelligence: Many studies have also demonstrated how emotional intelligence affects student learning outcomes, especially those in science materials that demand awareness of cooperation and higher-order thinking. In addition, emotional intelligence increases students' engagement as well as helps them cope with academic pressures. The effect of emotional intelligence on science learning is in Figure 2.

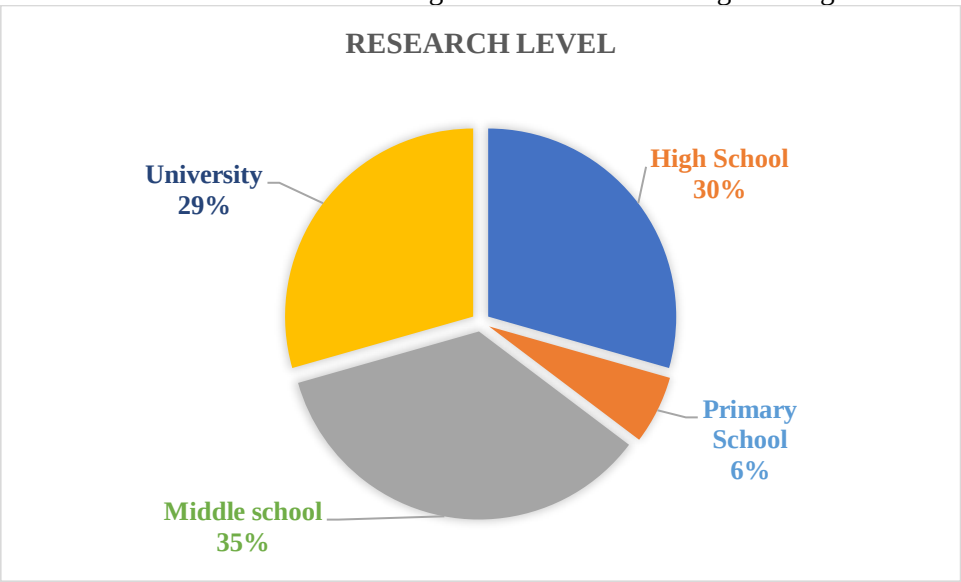

Figure 2 Level of education: Impact of emotional intelligence on students and science learning

Many science learning activities require cooperation, such as group projects and laboratory experiments. Emotional intelligence helps students understand group mates' emotions, empathize, and resolve conflicts constructively. Not only do students improve their social skills, but group projects also improve their cognitive outcomes as students learn from each other and engage in more in-depth discussions about scientific ideas (Ilma et al., 2022; Kerr & Coleman, 2021). Motivating students to think back about their emotional experiences related to learning. They can convey their feelings and thoughts

about scientific concepts through journals or group discussions (Mercader-Rubio et al., 2023; Sadr et al., 2024).

2. Relationship between Emotional Intelligence and Science Concept Understanding

Educators can significantly improve students' ability to manage emotions such as frustration and confusion by emphasizing knowledgeable empathy in science education. This support not only improves academic performance but also fosters a lifelong love for learning and investigating science. Incorporating mindfulness strategies into learning routines can help students manage their emotions and improve focus during challenging lessons (King et al., 2018). Results show that students' participation in discussions helps them understand broader scientific concepts (Jordan et al., 2015). This finding is supported by the fact that shared discussions play an important role in improving scientific literacy among teachers and students. Students who can empathize and communicate effectively in teams not only help each other work together, but also get a better learning experience, as it allows them to study scientific concepts from different points of view and collaborate to understand them (Menon et al., 2024; Singh et al., 2015).

A clear connection between the concepts taught in science and everyday life can increase understanding and the ability to retain those concepts. By connecting their learning with real-life problems, like conservation or ecosystems within their neighborhood, students develop emotional connections to learning that translate into greater engagement. "The theory goes that positive emotional arousal leads to better learning strategies, to a better understanding of theory, and to retention of theory." (Schmidt, 2020). This can result in better learning strategies, a better understanding, and the retention of scientific principles. Such positive emotions about excitement and satisfaction in science learning can also improve collaboration and relationships among students, making their learning experience better (Kim, 2020).

3. Integrating Emotional Intelligence with Science Teaching Strategies

Integrating emotional intelligence into science teaching strategies can significantly improve student engagement, motivation, and academic achievement. Educators can use several key strategies to do this, but a structured and creative approach is needed to do so. Research shows that such strategies improve emotional capability and academic performance in STEM subjects (Elmi, 2020). Making the classroom atmosphere more inclusive and participatory can foster emotional intelligence among students. Research shows that participatory and inclusive classroom settings are related to levels of emotional intelligence and academic achievement (Khurshid et al., 2018; Landau & Gavriel Meirovich, 2011). Regularly evaluating students' academic achievement and their emotional development can provide a useful picture of how successful emotional skills integration approaches are (Ruiz-Ariza et al., 2023). Self-assessment, peer evaluation, and teacher observation are some of the tools that can be used to track the progress of students' emotional development over time.

Applying emotional intelligence in science education, students not only gain a better understanding of the concepts but are also educated in social and emotional skills necessary for everyday life. This multifaceted method helps people learn more, become stronger, and communicate better. Ultimately, this approach results in a well-rounded person who can develop various aspects of life. Education that incorporates emotional intelligence supports overall development and enhances students' cognitive and emotional growth (Ayeni et al., 2024). When teachers model high emotional intelligence, they create a supportive classroom environment and encourage student engagement. Furthermore, when teachers demonstrate empathy and understanding, they create a positive learning atmosphere where students feel safe to express their thoughts and emotions (Luzuriaga, 2019; Paul & Guha, 2018). Active learning strategies that encourage critical thinking and problem-solving are

driven by the integration of emotional intelligence. When students have the opportunity to engage emotionally with the material, they tend to be more deeply involved, which results in a richer learning experience (Brown, 2003; Stejskalová et al., 2022).

CONCLUSION

Emotionally intelligent teaching approaches should be an integral part of the curriculum, especially in science learning, because they have a significant positive impact on engagement, critical thinking, and science learning outcomes. Integrating emotional intelligence in science learning gives students the ability to solve problems experienced in the learning process, and can also motivate them towards science learning. However, this study still has limitations in various aspects, such as (1) this study only relies on articles within a certain time frame (2015-2024). There may be more studies in this field outside of this time frame that were not considered in this analysis. (2) The data sources for this study are limited to articles accessible from several journal databases, so it is possible that some studies were not found during the data collection process for this study. (3) The number of articles considered in this study is limited, so it is not surprising that the results of this literature synthesis do not fully represent all studies on emotional intelligence in science learning in various educational contexts. Therefore, it is recommended that further research be conducted to expand the scope of the database, time range, and number of articles considered in this study in order to obtain a more comprehensive picture of this topic.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, KK, IKS, NKR, and IWS; methodology, KK, IKS, NKR, and IWS; data collection: KK, EF, and SS; formal analysis: KK, IKS, and NKR; preparation of the first draft: KK; review and editing of the manuscript: KK, IKS, NKR, and IWS. All authors have read and approved the published version of the manuscript.

AI DISCLOSURE STATEMENT

The author used artificial intelligence (AI) during the preparation of this work solely for the purpose of finding additional references. After using these tools/services, the author has thoroughly reviewed and edited the content as necessary and assumes full responsibility for the content of this publication.

REFERENCES

Abdillah, R. R., Al-Muhdhar, M. H. I., & Biruni, I. B. (2021). Fostering students' problem solving skills and environmental literacy through PBL with natural environmental exploration approach. *AIP Conference Proceedings*, *2330*(March). https://doi.org/10.1063/5.0043190

Acoci, A., Suardin, S., Yusnan, M., Omar, S., & Berngacha, S. (2022). Effects of emotional intelligence to learning achievement in elementary school. *Buletin Edukasi Indonesia*, *1*(02), 53–57. https://doi.org/10.56741/bei.v1i02.100

Akter, F., Islam, R., Sumona, S. I., Fahad, G. M. S. I., & Shetu, S. H. (2025). Emotional intelligence and academic performance : the mediating role of academic engagement. *Asian Journal of Education and Social Studies Volume*, *51*(12), 461–475.

Alfaruqy, M. Z. (2023). Parental social support and emotional intelligence of third-year junior high school students. *Jurnal Neo Konseling*, *5*(2), 45. https://doi.org/10.24036/00716kons2023

Aljasir, N. (2024). Emotional intelligence and engagement in language learning: a mixed-methods exploration of their impact on english language proficiency. *Theory and Practice in Language Studies*, *14*(9), 2982–2995. https://doi.org/10.17507/tpls.1409.34

Amirian, S. M. R., & Behshad, A. (2016). Emotional intelligence and self-efficacy of iranian teachers: A research study on university degree and teaching experience. *Journal of Language Teaching and Research*, *7*(3), 548–558. https://doi.org/10.17507/jltr.0703.16

Arias, J., Soto-Carballo, J. G., & Pino-Juste, M. R. (2022). Emotional intelligence and academic motivation in primary school students. *Psicologia: Reflexao e Critica*, *35*(1). https://doi.org/10.1186/s41155-022-00216-0

Ayeni, O. O., Chisom, O. N., Hamad, N. M. Al, Osawaru, B., & Adewusi, O. E. (2024). Enhancing STEM education through emotional intelligence and counseling techniques. *World Journal of Advanced Research and Reviews*, *21*(2), 903–916.

Aziz, A. R. A., Sulaiman, S., & Razak, N. H. A. (2020). Students' emotional intelligence and self-efficacy towards their academic performance: A survey study on public higher learning institution. *Universal Journal of Educational Research*, *8*(11C), 126–135. https://doi.org/10.13189/ujer.2020.082315

Azril, M. S., Krauss, S. E., & Samsul, S. F. S. (2018). A systematic review on Asian's farmers' adaptation practices towards climate change.

Bagum, M., Akram, M., Abbas, A., & Hussain, R. (2023). Role of emotional intelligence in students' learning at secondary level. *Pakistan Journal of Humanities and Social Sciences*, *11*(4), 4771–4781. https://doi.org/10.52131/pjhss.2023.v11i4.2017

Boccaccio, F. M., Gubitosa, S., & Pirrone, C. (2023). Exploring the interplay between facial expression recognition and emotional intelligence in adults: Implications for novel learning methods. *Education Sciences*, *13*(11). https://doi.org/10.3390/educsci13111112

Brígido Mero, M., Rodríguez de Castro, A., Lejárraga García, A., Laviña Pérez, I., & Nistal Anta, V. (2024). Emotional training for prospective teachers in science education. *Problems of Education in the 21st Century*, *82*(2), 236–251. https://doi.org/10.33225/pec/24.82.236

Brunello, G., & Schlotter, M. (2021). Non-cognitive skills and personality traits: Labour market relevance and their development in education & training systems. *SSRN Electronic Journal*, *5743*. https://doi.org/10.2139/ssrn.1858066

Cahyaningtiyas, E. (2022). Tingkat kecerdasan emosional peserta didik. *Epik: Jurnal Edukasi Penerapan Ilmu Konseling*, *1*.

Chen, H. (2022). The relationship between basic psychological needs satisfaction and university students ' academic engagement : The mediating effect of emotional intelligence. *Frontiers in Psychology*, *December*. https://doi.org/10.3389/fpsyg.2022.917578

Claudia-Raluca, S. (2022). Emotional intelligence and communication skills in the teaching-learning process. *The International Conference "Synergies in Communication"*.

Darling-hammond, L., Flook, L., Cook-harvey, C., & Barron, B. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, *24*(2), 97–140. https://doi.org/10.1080/10888691.2018.1537791

Daulay, M. I. (2022). The effects of emotional intelligence on the students' learning outcomes in a state high school. *AL-ISHLAH: Jurnal Pendidikan*, *14*(4), 5293–5298. https://doi.org/10.35445/alishlah.v14i4.1379

Devi, V. M., Susilawati, S., & Kosim, K. (2024). The effectiveness of developing science learning devices with the integrated pbl model of the stem approach in improving students' problem-solving ability and self-efficacy. *Jurnal Penelitian Pendidikan IPA*, *10*(5), 2530–2536. https://doi.org/10.29303/jppipa.v10i5.4352

Džafić, M., & Ilić, M. (2024). Emotional intelligence in teaching and learning. *Research in Pedagogy*, *14*(1), 62–73. https://doi.org/10.5937/istrped2401062d

Elmi, C. (2020). Integrating social emotional learning strategies in higher education. *European Journal of Investigation in Health, Psychology and Education*, *10*(3), 848–858. https://doi.org/10.3390/ejihpe10030061

Eugenio-Gozalbo, M., Truchero, G. R., & Rapp, C. V. (2019). University gardens: Identifying learning dimensions as perceived by future teachers. *Ensenanza de Las Ciencias*, *37*(3), 111–127. https://doi.org/10.5565/rev/ensciencias.2657

Fajar, S. B. (2023). Peranan orang tua dalam mengembangkan kecerdasan emosional anak. *Jurnal Edukasi*, *11*(2).

Gerard, L., Wiley, K., Debarger, A. H., Bichler, S., Bradford, A., & Linn, M. C. (2022). Self-directed science learning during covid-19 and beyond. *Journal of Science Education and Technology*, *31*(2), 258–271. https://doi.org/10.1007/s10956-021-09953-w

Grewal, N., & Ganguly, S. (2019). *Role of Emotional Intelligence in Leadership Qualities and Self-Efficacy Among University Students* (Issue May). Thapar Institute Of Engineering And Technology.

Guzman, L. L. De. (2025). The influence of emotional intelligence (ei) on the learning outcomes in science of ste junior high school students. *International Journal Of Research And Innovation In Social Science (IJRISS)*, *IX*(XI), 7329–7341. https://doi.org/10.47772/IJRISS

Hernández, M., & Hershaff, J. (2015). Skipping questions in school exams: The role of non-cognitive skills on educational outcomes. *Manuscript, Univ. Michigan.*

Ilma, S., Al-Muhdhar, M. H. I., Rohman, F., & Sari, M. S. (2022). Promoting students' metacognitive awareness and cognitive learning outcomes in science education. *International Journal of Evaluation and Research in Education*, *11*(1), 20–30. https://doi.org/10.11591/ijere.v11i1.22083

Ilmi, A. I. S., & Damayanti, P. (2020). Pengembangan kecerdasan emosional peserta didik di sekolah dasar melalui pendidikan karakter. *PENDASI: Jurnal Pendidikan Dasar Indonesia*, *4*(1).

Jepps, J., Noreen, S., & Kazim, B. (2022). Impact of teachers' emotional intelligence abilities on student motivation and their interaction with students in secondary school classrooms. *Journal of Educational Psychology and Pedagogical Sciences*, *1*(1), 17–37. https://doi.org/10.52587/jepps.v1i1.7

Jordan, R. C., Brooks, W. R., Delisi, J. R., Gray, S. A., Berkowitz, A. R., & Middendorf, G. (2015). Ecology nature of science: Shared discussions and practices among ecologists and high school teachers. *Ecosphere*, *6*(11), 1–17. https://doi.org/10.1890/ES13-00386.1

Juyal, S., Kuruva, M. B., Kashyap, M., & Kumar, S. (2023). Impact of emotional intelligence on academic performance of university students: Empirical evidence. *Journal of Mountain Research*, *18*(1), 233–243. https://doi.org/10.51220/jmr.v18i1.26

Kerr, D., & Coleman, S. (2021). Improving the student experience: Self- and peer-assessment in group projects. *EDULEARN21 Proceedings*, *1*, 7151–7155. https://doi.org/10.21125/edulearn.2021.1443

Khatoon, A., Afzal, A., Kiran, K., & Ijaz, B. (2020). Effects of emotional intelligence on students academic performance. *Journal La Edusci*, *1*(2), 13–18. https://doi.org/10.37899/journallaedusci.v1i2.91

Khurshid, M. A., Majoka, M. I., & Saeed Khan, M. (2018). Development of emotional intelligence of university students: an investigation of the effect of curricular activities-report measure of emotional intelligence (srmei). *Pakistan Journal of Distance & Online Learning*, *I*, 215–234.

Kim, D. (2020). The correlation analysis between Korean middle school students' emotional level and friendship in science learning. *Jurnal Pendidikan IPA Indonesia*, *9*(1), 22–31. https://doi.org/10.15294/jpii.v9i1.22744

King, D., Henderson, S., & Sandhu, M. (2018). Deep breathing as a mindfulness practice in year 10 science. *Learning: Research and Practice*, *4*(1), 91–101. https://doi.org/10.1080/23735082.2018.1428142

King, H., Brock, R., Healy, L., Glackin, M., King, H., Brock, R., Healy, L., Glackin, M., King, H., Brock, R., Healy, L., & Glackin, M. (2025). Communication and public engagement science learning as a rich , complementary interplay between symbolic , embodied , and emotional aspects of learning symbolic , embodied , and emotional aspects of learning. *International Journal of Science Education, Part B*, *15*(4), 597–611. https://doi.org/10.1080/21548455.2025.2453952

Kitchenham, B., & Charters, S. M. (2007). Guidelines for performing systematic literature reviews in software engineering. *Technical Report, Ver. 2.3 EBSE Technical Report. EBSE, January 2007*, 1–57.

Krajcik, J., Miller, E., Chen, I., Baker, Q., Bartz, K., Codere, S., & Peek-brown, D. (2022). Science learning in elementary schools. *American Educational Research Journal*, *XX*(X), 1–33. https://doi.org/10.3102/00028312221129247

Kristiawan, M., Bimayu, W., Fitriani, Y., Negeri, S., & Rotan, S. (2020). The effect of emotional intelligence, student's motivation toward student's achievement. *International Journal of Progressive Sciences and Technologies (IJPSAT)*, *20*(1), 6–16.

Kurniady, Y. S. M. (2023). Pentingnya kecerdasan emosional bagi motivasi belajar peserta didik pada mata pelajaran pendidikan agama kristen di sma antiokhia ketapang kalimantan barat. *Jurnal Pendidikan Agama Kristen*, *5*(2).

Kurniawati, A. (2017). Utilizing of comic and jember's local wisdom as integrated science learning materials. *International Journal of Social Science and Humanity*, *7*(1), 47–50. https://doi.org/10.18178/ijssh.2017.v7.793

Kutluk, H., Jaworski, D., Zheng, H., & Krajka, V. (2025). Designed-to-fail : Using structured failure in laboratory courses as a tool for nature of science education. *Education Sciences*, *15*(9), 1–30.

Landau, J., & Gavriel, M. (2011). Development of students' emotional intelligence: participative classroom environments in higher education. *Academy of Educational Leadership Journal*, *15*(3), 89–105.

Lansigan, A. (2021). Learning in the new hybrid model of education: Understanding the emotional intelligence of the uphsd calamba students in the new normal. *Proceedings of the 1st International Conference on Social Science, Humanities, Education and Society Development, ICONS 2020*. https://doi.org/10.4108/eai.30-11-2020.2303754

Leasa, M., Corebima, A. D., Ibrohim, & Suwono, H. (2017). Emotional intelligence among auditory, reading, and kinesthetic learning styles of elementary school students in Ambon-Indonesia. *International Electronic Journal of Elementary Education*, *10*(1), 83–91. https://doi.org/10.26822/iejee.2017131889

Li, F., Wang, M., Nan, X., Liu, X., Zhou, C., & Gong, D. (2021). Exploration of problem-based learning at inter-course level. *ICETC 2021: 2021 13th International Conference on Education Technology and Computers*, 309–313. https://doi.org/https://doi.org/10.1145/3498765.3498813

Lin, X. F., Tang, D., Lin, X., Liang, Z. M., & Tsai, C. C. (2019). An exploration of primary school students' perceived learning practices and associated self-efficacies regarding mobile-assisted seamless science learning. *International Journal of Science Education*, *41*(18), 2675–2695. https://doi.org/10.1080/09500693.2019.1693081

Luy-Montejo, C. (2019). Problem based learning (pbl) in the development of emotional intelligence of university students. *Propósitos y Representaciones*, *7*(2). https://doi.org/10.20511/pyr2019.v7n2.288

Luzuriaga, R. F. (2019). What teachers do to develop emotional intelligence in university classrooms? A qualitative study. *Espiral. Cuadernos Del Profesorado*, *12*(25), 101–110.

MacCann, C., Jiang, Y., Brown, L. E. R., Double, K. S., Bucich, M., & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *American Psychological Association*, *146*(2), 150–186. https://doi.org/https://doi.org/10.1037/bul0000219

Mason, L. (2020). Conceptual change. *Oxford Research Encyclopedia of Education.* https://doi.org/https://doi.org/10.1093/acrefore/9780190264093.013.870

Menon, B., Ranabothu, M. R., Tarter, K. E., Oneal, T. D., Mukundan, D., & Laukka, J. J. (2024). Reinforcement of core foundational science concepts during clinical rotations : A strategy to enhance medical student learning and diagnostic reasoning department of medical education department of pediatrics department of neurology university of toledo c. *Adv Physiol Educ.*, *419*.

Mercader-Rubio, I., Ángel, N. G., Silva, S., Furtado, G., & Brito-Costa, S. (2023). Intrinsic motivation: Knowledge, achievement, and experimentation in sports science students—relations with emotional intelligence. *Behavioral Sciences*, *13*(7). https://doi.org/10.3390/bs13070589

Meti, P., C, S., & S Natekar, D. (2022). A cross sectional study of emotional intelligence among nursing students in selected nursing college at bagalkot. *Galore International Journal of Applied Sciences and Humanities*, *6*(3), 87–91. https://doi.org/10.52403/gijash.20220712

Ngui, G. K., & Lay, Y. F. (2020). The effect of emotional intelligence, self-efficacy, subjective well-being and resilience on student teachers' perceived practicum stress: A Malaysian case study. *European Journal of Educational Research*, *9*(1), 277–291. https://doi.org/10.12973/eu-jer.9.1.277

Nieto, A., Sánchez-Rosas, J., & Gómez-Iñiguez, C. (2024). Identifying the role of emotional intelligence in achievement emotions and their effects on deep learning strategies in university students. *Revista de Psicodidáctica (English Ed.)*, *29*(1), 47–56. https://doi.org/10.1016/j.psicoe.2023.11.003

Pařízek, M. (2021). Principles of holistic education applied to the teacher education model for the 21st century in singapore. *Sociální Pedagogika / Social Education*, *9*(2), 9–22. https://doi.org/10.7441/soced.2021.09.02.01

Pashchenko, O., Medvedovska, T., Terkhanova, O., Baidak, A., & Yulia Danyliuk. (2024). The impact of emotional intelligence on academic achievement. *PROSVITA: Pedagogical Scientific Journal*, *2*, 57–70. https://doi.org/https://doi.org/10.36074/PrOsvita.issue2.004

Paul, U., & Guha, A. (2018). Emotional intelligence and attitude towards constructivist approach of teaching in science education: Perspective of school teachers. *Journal Homepage: International Journal of Research in Social Sciences*, *8*(1), 2249–2496.

Pradhan, S. K., & Jena, A. C. (2024). Emotional intelligence and its impact on academic performance of ug students of berhampur city. *International Research Journal of Modernization in Engineering Technology and Science*, *03*. https://doi.org/10.56726/irjmets51340

Prananda, G., Prihantini, P., Judijanto, L., Purwoko, B., Stavinibelia, Lestari, N. C., & Efendi, N. (2023). Application of demonstrated learning methods to increase primary school students' science learning results. *Jurnal Penelitian Pendidikan IPA*, *9*(12), 12175–12181. https://doi.org/10.29303/jppipa.v9i12.6344

Pursitasari, I. D., Nuryanti, S., & Rede, A. (2015). Promoting of thematic-based integrated science learning on the junior high school. *Journal of Education and Practice*, *6*(20), 97–101. http://search.proquest.com/docview/1773222449?accountid=8330

Putra, A. R., & Darmawan, D. (2022). Pencapaian efektivitas kerja melalui optimalisasi kecerdasan emosional dan pemberian beban kerja secara tepat kepada karyawan. *Jurnal Baruna Horizon*, *5*(1).

Quílez-Robres, A., Usán, P., Lozano-Blasco, R., & Salavera, C. (2023). Emotional intelligence and academic performance: A systematic review and meta-analysis. *Thinking Skills and Creativity*, *49*(June). https://doi.org/10.1016/j.tsc.2023.101355

Radu, B. M., Timplarescu, T., & Coporan, A. M. (2024). Impact of emotional intelligence on academic performance. *Management Student Working Papers*, *18*(1). Https://Doi.Org/10.24818/MSWP.2024.010

Rahmania, I. (2021). Project based learning (pjbl) learning model with stem approach in natural science learning for the 21st century. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *4*(1), 1161–1167. https://doi.org/10.33258/birci.v4i1.1727

Randall, B. (2003). Emotions and behavior: Exercises in emotional intelligence. *Journal of Management Education*, *27*(1). https://doi.org/https://doi.org/10.1177/1052562902239251

Rauf, A., Suarman, S., & Kartikowati, S. (2020). The influence of emotional intelligence and student learning behavior through student motivation on student learning outcomes. *Journal of Educational Sciences*, *4*(4), 881. https://doi.org/10.31258/jes.4.4.p.881-889

Raven, S., & Wenner, J. A. (2023). Science at the center: Meaningful science learning in a preschool classroom. *Journal of Research in Science Teaching*, *60*(3), 484–514. https://doi.org/10.1002/tea.21807

Rivana, A. (2019). Pentingnya kecerdasan emosional pendidik dalam meningkatkan pendidikan karakter. *Jurnal Asy-Syukriyah*, *20*(2), 70-84.

Rogulska, O., Rudnitska, K., Mahdiuk, O., Drozdova, V., Lysak, H., & Korol, S. (2023). The today's linguistic paradigm: The problem of investigating emotional intelligence in the learning of a foreign language. *Revista Romaneasca Pentru Educatie Multidimensionala*, *15*(4), 458–473. https://doi.org/10.18662/rrem/15.4/804

Romanelli, F., Cain, J., & Smith, K. M. (2006). reviews emotional intelligence as a predictor of academic and/or professional success. *American Journal of Pharmaceutical Education* , *70*(3).

Rudi, P. (2023). Increasing elementary school students' science learning outcomes through problem-based learning. *Classroom Experiences*, *1*(1), 30–34. https://doi.org/10.59535/care.v1i1.34

Ruiz-Ariza, A., López-Serrano, S., Suárez-Manzano, S., & Martínez-López, E. J. (2023). Integrating cognitive contents in physical education classes: effects on cognitive variables and emotional intelligence. *Kinesiology*, *55*(1), 95–107. https://doi.org/10.26582/k.55.1.10

Sadr, F., Zargarinejad, G., Lavasani, F. F., & Tajrishi, K. Z. (2024). The mediating role of intrinsic motivation in the relationship of emotion regulation styles and self-determination with goal pursuit in iranian adolescents. *Iranian Journal of Psychiatry and Clinical Psychology*, *29*(4), 478–493. https://doi.org/10.32598/ijpcp.29.4.4694.1

Saido, G. M., Siraj, S., Nordin, A. B. Bin, & Al_Amedy, O. S. (2015). Higher order thinking skills among secondary school students in science learning. *The Malaysian Online Journal of Educational Science*, *3*(3). https://doi.org/10.1109/TAP.2018.2845550

Sánchez-Álvarez, N., Berrios Martos, M. P., & Extremera, N. (2020). A meta-analysis of the relationship between emotional intelligence and academic performance in secondary education: A multi-stream comparison. *Frontiers in Psychology*, *11*. Frontiers Media S.A. https://doi.org/10.3389/fpsyg.2020.01517

Schmidt, S. J. (2020). Exploring the influence of course elements and emotional connection to content on students' approaches to learning in an introductory food science and

human nutrition course. *Journal of Food Science Education*, *19*(2), 59–73. https://doi.org/10.1111/1541-4329.12180

Sen, A., Thulasingam, M., Olickal, J. J., Sen, A., Kalaiselvy, A., & Kandasamy, P. (2022). Emotional intelligence and perceived stress among undergraduate students of arts and science colleges in Puducherry, India: A cross-sectional study. *Journal of Family Medicine and Primary Care*, *6*(2), 169–170. https://doi.org/10.4103/jfmpc.jfmpc

Sholina, A., & Dwi, M. F. (2019). Kecerdasan emosional peserta didik di sd takhassus al-quran kalibeber wonosobo. *Jurnal Abdau : Jurnal Pendidikan Madrasah Ibtidaiyah*, *2*(1).

Singh, A. P., Gupta, A., Gulvady, R., Mhamane, A., & Edward, T. S. (2015). Doing is understanding: science fun in India. *Journal Reference: Science in School*, *34*, 45–51.

Stejskalová, I., Komárková, L., Sláma, J., Přibyl, V., & Štych, P. (2022). Personality development as a key aspect of teacher learning: A pilot study of the training programme effects within the clima concept. *Journal on Efficiency and Responsibility in Education and Science*, *15*(3), 168–180. https://doi.org/10.7160/eriesj.2022.150304

Stella, Y., Binar, S., Purwanto, A. T., & Octavianus, J. (2023). Emotional intelligence and spiritual intelligence on student learning motivation. *Journal Didaskalia*, *6*(1), 23–29. https://doi.org/10.33856/didaskalia.v6i1.298

Sulastri, M. P., & Mala, I. K. (2023). The role of emotional intelligence on the development of critical thinking: A study of department of accounting students, universitas negeri malang, indonesia. *Arkus*, *9*(1), 275–279. https://doi.org/10.37275/arkus.v9i1.281

Suleman, Q., Hussain, I., Syed, M. A., Parveen, R., Lodhi, I. S., & Mahmood, Z. (2019). Association between emotional intelligence and academic success among undergraduates: A cross-sectional study in KUST, Pakistan. *PLoS ONE*, *14*(7). https://doi.org/10.1371/journal.pone.0219468

Supriyadi, S. (2023). Effect of emotional intelligence on science learning outcomes in students given associational and conventional multiple-choice tests. *Jurnal Penelitian Pendidikan IPA*, *9*(4), 2002–2009. https://doi.org/10.29303/jppipa.v9i4.3220

Suswandi, A. G. A., Suherti, H., & Gumilar, G. (2023). The influence of emotional intelligence on learning motivation and its implications on student learning outcomes in the subject of economics. *Romeo Review of Multidisciplinary Education Culture and Pedagogy*, *2*(4), 205–216. https://doi.org/10.55047/romeo.v2i4.897

Sutiani, A., Situmorang, M., & Silalahi, A. (2021). Implementation of an inquiry learning model with science literacy to improve student critical thinking skills. *International Journal of Instruction*, *14*(2), 117–138. https://doi.org/10.29333/iji.2021.1428a

Tea, A., & Ovid, D. (2024). A model for emotional intelligence in biology education research. *CBE Life Sciences Education*, 1–16. https://doi.org/10.1187/cbe.23-10-0198

Tomory, I. (2023). Student centered methods, soft skills and competency based learning from the view of engineering and technical teacher students. *20th International Conference on Cognition and Exploratory Learning in Digital Age, CELDA 2023*, 116–124. https://doi.org/10.33965/celda2023_202306l015

Vargha, M., & Chidanand, B. P. (2018). A study of gender differences in emotional intelligence and learning behaviour among children. *International Journal of Indian Psychology*, *6*(4). https://doi.org/10.25215/0604.047

Verawati, N. N. S. P., & Sarjan, M. (2023). The philosophy of critical thinking in problem-based science learning. *Prisma Sains : Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, *11*(4), 992. https://doi.org/10.33394/j-ps.v11i4.9101

Vilhunen, E., Turkkila, M., Lavonen, J., Salmela-Aro, K., & Juuti, K. (2022). Clarifying the relation between epistemic emotions and learning by using experience sampling method and pre-posttest design. *Frontiers in Education*, *7*(April), 1–11. https://doi.org/10.3389/feduc.2022.826852

Wahono, R. S. (2015). A systematic literature review of software defect prediction : research trends, datasets, methods and frameworks. *Journal of Software Engineering*, *1*(1).

Wakit, S., Margiyono, S., & Ainur, R. (2024). Examples and non examples learning training to determine the reading ability of primary school students. *ABDIMAS: Jurnal Pengabdian Masyarakat*, *7*(3), 1266–1271. https://doi.org/10.35568/abdimas.v7i3.5013

Warneri, W., Maria, U., Okianna, M. Basri, & Husni, S. (2023). Understanding social intelligence, emotional intelligence and interpersonal communication of economic education students in the learning process. *Mattawang: Jurnal Pengabdian Masyarakat*, *4*(1), 22–27. https://doi.org/10.35877/454ri.mattawang1053

Watanabe, N. (2019). Effective simple mathematics play at home in early childhood: promoting both non-cognitive and cognitive skills in early childhood. *International Electronic Journal of Mathematics Education*, *14*(2), 401–417. https://doi.org/10.29333/iejme/5739

Yahaya, A., Sar Ee, N., Junaidah Bachok, D., Yahaya, N., Boon, Y., Hashim, S., & Mo Lee, G. (2012). The impact of emotional intelligence element on academic achievement. *Archives Des Sciences*, *65*(4).

Zixiang, W., Bo, Y., Xiaoyu, L., & Ghosh, A. (2023). The importance of emotional intelligence in the successful leadership of mba programs. *International Journal for Multidisciplinary Research (IJFMR)*, *5*(6).

AUTHOR PROFILES

Name: Kamaluddin
E-mail address: kamalphysic20@gmail.com
Affiliation: Universitas Pendidikan Ganesha
https://scholar.google.com/citations?user=tLBcqpIAAAAJ&hl=en

Name: Ketut Suma
E-mail address: ketut.suma@undiksha.ac.id
Affiliation: Universitas Pendidikan Ganesha
https://scholar.google.com/citations?user=CiOWx50AAAAJ&hl=en

Name: I Ketut Rapi
E-mail address: ketut.rapi@undiksha.ac.id
Affiliation: Universitas Pendidikan Ganesha
https://scholar.google.com/citations?user=6-uzUZQAAAAJ&hl=id

Name: I Wayan Suastra
E-mail address: iwsuastra@undiksha.ac.id
Affiliation: Universitas Pendidikan Ganesha
https://scholar.google.com/citations?user=ssSbL_oAAAAJ&hl=en

Name: Edi Firmansyah
E-mail address: edifirmansyah1892@gmail.com
Affiliation: STKIP Al-Amin Dompu
https://scholar.google.com/citations?user=hx2fbIYAAAAJ&hl=en

Name: Sofyan Syamratulangi
E-mail address: syamratulangisofia@gmail.com
Affiliation: STKIP Al-Amin Dompu
https://scholar.google.com/citations?hl=en&user=2ctIrMIAAAAJ