IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

ARTIFICIAL INTELLIGENCE IN EDUCATION: A REVIEW OF ITS INFLUENCE ON STUDENTS' EMOTIONAL PROCESSES AND LEARNING OUTCOMES.

Mrs.Vanessa. KA[1] *,
Full Time Research Scholar, Department of Rural Industries and Management,
The Gandhigram Rural Institute – Deemed to be University, Dindigul District, Tamil Nadu, India.

Mr. G. Kingsly [2],
Research Scholar, Department of Rural Industries and Management, The Gandhigram Rural Institute - Deemed to Be University, Gandhigram, Tamil Nadu, India.

Dr. H. Samuel Thavaraj [3],
Associate Professor, Department of Rural Industries and Management,
The Gandhigram Rural Institute – Deemed to be University, Dindigul District, Tamil Nadu, India.

ABSTRACT:

The learning environment has been broadly deployed with artificial intelligence (AI), and has facilitated personalized learning, adaptive feedback, and information-based learning support. Though most of the available literature has been based on cognitive and academic impact of AI in education, its impact on emotional intelligence (EI) of students has not been developed to its full potential. Emotional intelligence, which involves emotional awareness, emotional regulation, motivation, and social skills are critical to the engagement, well-being, and academic performances of the students. The current review is an overview of the works that discuss the impact of the application of AI to the educational process on the emotional intelligence of the students, specifically, the intelligent tutoring system, emotion-sensitive AI, affective computing, and AI-mediated feedback strategies. The evidence under review suggests that AI-based learning environments can facilitate the primary areas of emotional intelligence, namely, self-regulation and motivation, through adaptive scaffolding, individualized emotional feedback, and learning assistance in a timely fashion. In addition, AI applications are applied to improve academic engagement, decrease stress and anxiety, and improve emotional stability in students. Nonetheless, the issues of data privacy, emotional surveillance, and inability of AI to replicate human interaction of emotions are still relevant ethical issues. The review demonstrates that it is necessary to have human-oriented and ethically-oriented AI systems capable of assisting in cognitive and emotional areas of student learning.

Keywords: Artificial Intelligence in Education, Emotional Intelligence, Affective Computing, Adaptive Learning Systems, Student Well-Being.

1.INTRODUCTION:

The concept of artificial intelligence (AI) has introduced fundamental changes to the field of education by enabling the creation of adaptive learning environments, intelligent tutoring systems, and enhanced learning analytics. These developments allow educational platforms to be dynamically responsive to the profile of individual learners, their preferences, and their progress, and enable more personalized and learner-centered teaching and learning. With the mass quantities of educational data, AI-based systems can identify learning patterns, predict performance, and provide targeted interventions. In this case, (Garzón et al., 2025) observe the growing trend towards AI-based personalized learning environments, which are linked to enhanced student engagement, improved knowledge acquisition and learning outcomes.(Dhanasekaran & Thavaraj, 2024)

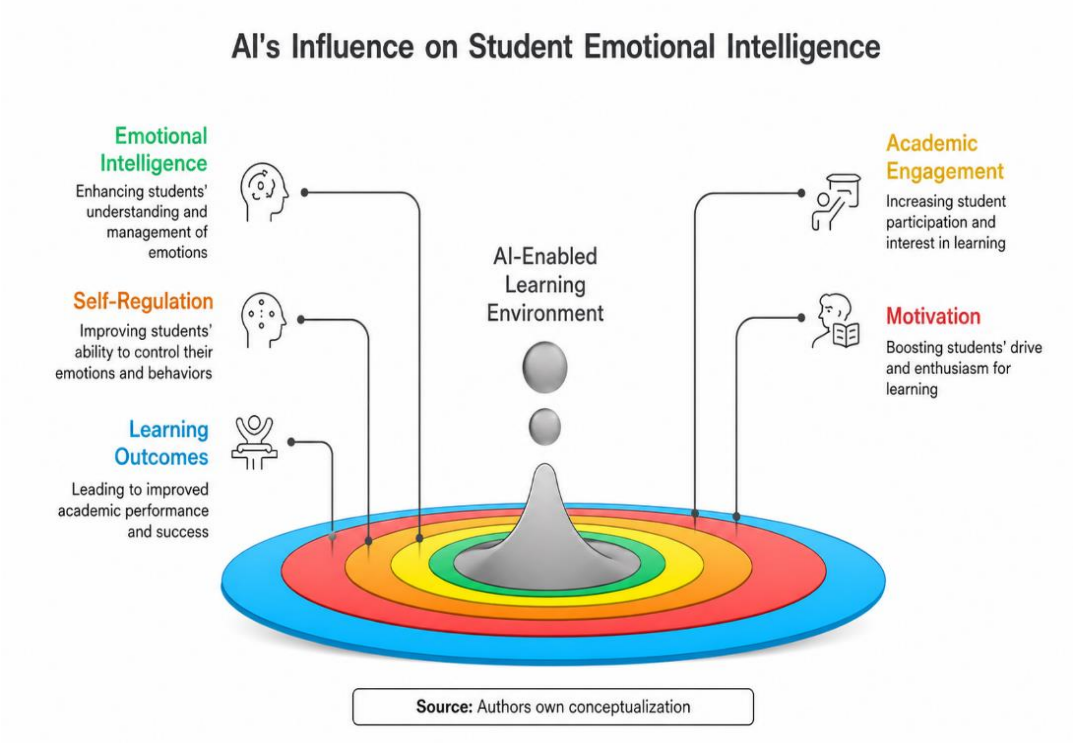
Along with the long-standing applicability of AI in facilitating the cognitive processes, it is increasingly utilized to facilitate the emotional part of the learning process. Learning is not a cognitive process, but it is strongly influenced by emotional conditions of students, their stress, motivation, frustration, and confidence. Such emotional states can be recognized and decoded by modern AI solutions, which are based on multimodal inputs, i.e. facial expressions, vocal traits, and behavioral interactions within online

learning systems. With this real-time emotional information, AI systems can modify the instructional strategies, pacing, and feedback to better address the needs of the learner. (Salloum et al., 2025) demonstrate that these AI systems that are sensitive to emotions can significantly enhance the involvement of the learners, active interaction, and the quality of the instruction by ensuring that the feedback is not merely emotionally responsive, but also contextually relevant.

Affective computing is one of the primary areas of this discipline, the purpose of which is to enable machines to recognize, detect, and respond to human feelings in a meaningful way. Affective computing technologies are integrated into digital platforms in learning settings to create emotionally intelligent learning environments, which are able not only to react to what students know but also to their feelings. These systems can provide encouraging feedback during a time of struggle, encourage perseverance and establish a favorable emotional atmosphere to study. According to the authors of (Yuvaraj et al., 2025) it is possible to enhance the degree of motivation of students by using emotion-sensitive technologies, make learning more emotional, and participate in learning activities more with the help of such technologies. This results in improved cognitive and affective learning, and thus a more holistic learning process.

Despite these developments, a significant gap in the literature related to the direct impact of AI-based emotional technologies on emotional intelligence (EI) of students still exists(Environments et al., 2023). Emotional intelligence is a competence, possibly emotional awareness, emotional control, empathy, and social skills, that are essential to effective learning, academic performance, and psychological health. Even though AI systems are increasingly able to recognize and respond more easily to emotions, it is still not clear how much it can actively develop such emotional skills in learners. It is possible that emotional AI can influence the emotional and motivational processes of learners, but empirical evidence that explicitly addresses its role in the development of emotional intelligence as a systematized construct is limited (Zhang et al., 2024).

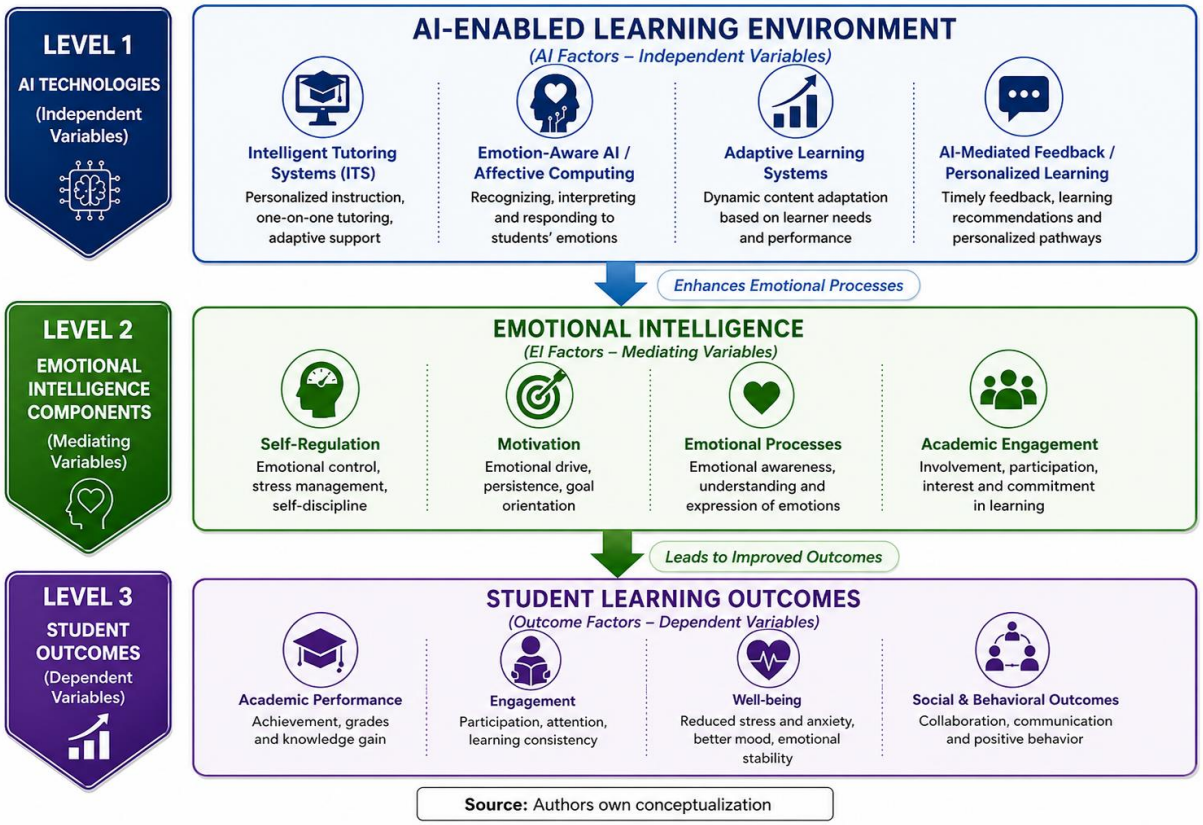
It is against this backdrop that the present review tries to comprehend the cross-section point of artificial intelligence and emotional intelligence within the educational context. Specifically, it will identify the critical AI technologies that have already been applied to the learning environments, discuss the impact of the technologies on various aspects of emotional intelligence, and evaluate the overall impact of the technologies on the learning experiences of students. Moreover, the review shows the gaps in the existing research and discusses the critical ethical concerns, including the privacy of data, emotional tracking, and the fact that AI cannot simulate the emotional interaction with a human. This way, it will assist in developing a more specific image of how AI can be implemented effectively and conscientiously to support not only cognitive but also emotional development of students(Lin & Chen, 2024).



1.1 Conceptual frame work:

The conceptual framework of this review explains how artificial intelligence (AI) technologies in education influence the emotional intelligence and learning outcomes of students in a series of interconnected processes. Artificial intelligence (AI) applications that can be used as the primary inputs are intelligent tutoring systems, affective computers, and learning analytics, which react to learners by providing adaptive instructions, real-time feedback, and emotion-sensitive responses. The first impact of these technologies on students is the emotional processes, including emotional awareness, emotional recognition, and emotional regulation, by identifying the states, frustration, confusion, or engagement, and responding to the states. This process assists in developing key areas of emotional intelligence, which include self-regulation, motivation and emotional engagement, enabling the students to have more control of their emotions in the learning process. These enhanced emotional abilities, Overall, emotional intelligence is a crucial component of the overall learning of students, which bridges the cognitive abilities with the emotional processes .(Indhirapratha et al., 2024)

Its impact is not limited to academic performance but to social adaptability, mental health, and life-long learning abilities. In this respect, emotional intelligence should be developed within the learning environment in such a way that the students can be well equipped to overcome not only the academic difficulties but also social life in the real world.(Pathinettampadiyan & Thavaraj, 2025)



2. AI-ENABLED STUDENT LEARNING ENVIRONMENT:

Artificial intelligence (AI) has increasingly been implemented in the learning environment to support and enhance the learning experience of learners through technologies such as adaptive learning systems, intelligent tutoring systems, and learning analytics(Environments et al., 2023). Such artificial intelligence solutions enable learning platforms to tailor learning to the needs, preferences and performance levels of individual learners and forego traditional one-size-fits-all approaches to teaching. Through constant observation of student progress, and analysis of learning patterns, AI systems can pinpoint strengths, weaknesses, and learning gaps with more accuracy. On the basis of this analysis, they offer personalized information, feedback in time, and focused instructional assistance, which not only enhances comprehension but also assists learners to advance at their own speed. Consequently, the learning process is more efficient, structured and engaging. Furthermore, these technologies enable greater interaction between students and the digital technologies, such as interactive interfaces, instant feedback and adaptive tasks, which facilitates active engagement, extended engagement and cognitive engagement in the learning process.

It is important to note that AI in education is not to replace human teachers, but to support and complement their teaching practices. According to(Holmes et al., 2022) AI is a type of assistive technology that enhances academic learning and behavioral growth by automating routine academic tasks, such as grading, progress monitoring, and content delivery. This will allow the teachers to allocate more time to the higher-order aspects of instruction like critical thinking development, individualized mentoring and emotional support of the students. In addition, AI may assist teachers to identify students who may be performing poorly or those who may be emotionally distressed in order to intervene early enough and be able to manage the classroom more effectively. A more balanced and effective learning experience in which AI systems support learning with human teachers who provide empathy, direction, and contextual insight is created by such a partnership between AI systems and teachers(Kim, 2023).

Additionally, AI can also play a crucial role in supporting student-centered learning by the continuous evaluation and individualized learning paths. The system that (Zawacki-Richter et al., 2019) describes relies on AI and provides constant feedback and adaptive learning routes that evolve based on the advancement of students and the changing learning needs. These systems allow the learning process to be more controlled by the learners by providing them with flexible pacing, personalized learning goals, and personalized instructional plans. Though the primary goal of such systems is to promote the cognitive performance, indirect effects on the emotional experiences of students are also important. To illustrate this, personalized feedback can reduce the sense of confusion and frustration and adaptive support can increase confidence and the sense of achievement. In its turn, that enhances the motivation, encourages perseverance, and increases the emotional engagement in the learning processes(Gregory & Kaufeldt, 2010).

Overall, AI in education, besides making the process of teaching and learning more efficient and improving academic outcomes, has a considerable impact on the learning process of students, both behaviorally and emotionally. The AI technologies may be utilized to facilitate a more holistic approach to learning, which takes into account both cognitive and affective aspects of student development by offering responsive, adaptive and personalized learning environments. These spaces enable the learners to be more active, independent and emotionally robust, which ultimately results to more important and effective learning results(Kariippanon et al., 2017).

In addition, the technologies enable increased interaction between students and digital technologies such as interactive interfaces, instant feedback, and adaptive tasks which facilitate active engagement, sustained engagement, and cognitive engagement in the learning process.

3. EMOTIONAL PROCESSES AND EMOTIONAL INTELLIGENCE IN STUDENTS

Emotional intelligence (EI) is the skill of students to recognize, comprehend, manage, and successfully apply emotions in academic and social situations(Romanelli et al., 2006). It involves a set of competencies that allow individuals to be able to control their own moods as well as react suitably to the moods of others. Emotional intelligence is an important aspect of learning that influences the way students go about their learning activities, socialization and the way students handle academic problems in the learning environment. Higher EI students are in a better position to cope with stress, remain focused, and adjust to evolving academic requirements, thus improving their overall learning experience.

positively impact learning outcomes, such as academic success, perseverance, participation, and well-being. By so doing, the framework highlights the progressive interdependence of AI technologies and emotional processes, which constitute emotional intelligence, which leads to improved learning outcomes(Tuomi, 2022).

It is noted that emotionally intelligent students are more self-regulated (Mayer et al., 2008) i.e. they are able to control the impulsive reactions, anxiety, and maintain the balance of emotions in the presence of a challenging situation. In addition to self-regulation, interpersonal skills of such students are highly developed and can be applied to communicate, collaborate, and develop relationships in the classroom environment. These are more applicable in a group-based learning and interactive learning environment where social interaction and emotional sensitivity can be a key factor in defining the learning process. Further, emotionally intelligent individuals tend to be more inclined to adaptive coping styles, which allows them to respond positively to academic pressures and failures rather than experience a more prolonged stress or disengagement.

Expanding on this perception,(Petrides et al., 2016) describe emotional intelligence as a dynamic and developable skill that is informed by experience, feedback and socialization. Unlike the fixed cognitive abilities, EI is something that can be enhanced over time as it is exposed to emotionally rich learning environments and through reflective practices. This is especially true of the cases, which presuppose cooperation, problem-solving, and emotionally demanding academic tasks, when students must negotiate complex interpersonal relations and manage their emotional responses. In this case, higher levels of EI will result in enhanced teamwork, decision-making, and learning behaviors.

Moreover, emotional intelligence is closely related to such significant educational outcomes as academic engagement, motivation, and psychological well-being. Students who are able to understand and control their emotions will be able to remain involved in the learning process, persevere through difficulties and be positive about learning. Emotional awareness will assist the learners to know their areas of strength and weakness and gain a sense of self-efficacy and confidence. These, in their turn, result in improved academic performance and learning experience.

3.1 Emotional Intelligence

Emotional intelligence (EI) has risen as an important psychological construct in the educational studies discipline, particularly in the context of how students are able to cope with their emotions, remain motivated and academically successful in an ever-growing technology-driven learning environment. In general, EI may be defined as the ability to identify, understand, manage and regulate personal and other people emotional states. The skill plays a significant role in the learning process to shape the learning behaviours, emotional strength, classroom behaviour, problem-solving skills and the overall performance of the students. It also enables adaptive coping strategies, which enables the learners to cope with academic stress and respond positively to feedback, challenges and failures in the learning process.

Emotional intelligence has gained even greater significance in the contemporary education, especially, with the introduction of digital tools and artificial intelligence systems. Students are being challenged to engage in self-directed learning, virtual collaboration and technology mediated instruction, which requires a high level of emotional awareness and control. In this respect, EI is a core competence that allows cognitive engagement through reducing emotional interruptions such as anxiety, frustration, and lack of motivation that render the learning environment more stable.

The recent empirical studies are very supportive of the positive relationship between emotional intelligence and academic and psychological performance of students(King et al., 2020)demonstrated that emotional intelligence is a powerful predictor of academic success and mental health. Their findings also revealed that the mediating variables are motivation, self-efficacy, and resilience and that emotionally intelligent students are more likely to continue with learning activities and successfully cope with academic stress. This suggests that EI is not an autonomous process but it instead interacts with other internal psychological processes that directly influence the learning outcomes. Furthermore, their study indicates that emotionally intelligent students are more inclined to exhibit higher goal orientation, better stress management, and improved emotional balance in instances of academic problems.

Similarly, (Zhou et al., 2024) in a systematic review and meta-analysis determined that emotional intelligence has significant and statistically significant correlations to student academic performance in different learning settings. Their study indicates that students with a higher level of EI tend to depict improved academic performance due to their ability to have better emotional regulation, interpersonal relationship, and cope with stress during the learning processes. In addition, the authors also observe that EI can be used to develop positive learning attitudes that in the long run, increase academic persistence and engagement. Overall, AI in education does not merely increase the efficiency of learning and academic success, but it also plays a significant role in the way students learn, both behaviorally and emotionally.(MAVROU, 2024) The AI technologies may be applied to facilitate a more holistic approach to learning, which takes into account not only the cognitive but also the affective component of student development through responsive, adaptive and personalized learning settings. Such environments enable learners to be more active, independent and emotionally robust, which ultimately results in greater and more meaningful learning. Moreover, emotional intelligence helps students to think reflectively and have emotional self awareness that enhances their adjustment to changing learning.

Accordingly, (Kingdom, 2024) notes that emotional intelligence is significant in the overall development of students, including interpersonal communication, emotional control, empathy construction, and classroom participation. The study hypothesizes that emotionally intelligent students are better placed to create a positive relationship with their peers and teachers and thus enhance collaborative learning and performance in school. Moreover, EI has been associated with an improved conflict management and classroom harmony, which is essential to a favorable learning environment that fosters academic growth.

Moreover, (Sternberg, 2019) in a systematic literature review have reported that emotional intelligence positively affects academic performance and the general well-being of students across different levels of education. Their findings suggest that EI enhances flexibility, emotional stability, and perseverance in learning, which are the determinants of success in the structured and technology-enhanced learning environments. The other important point that the study has brought to the fore is that emotional intelligence is a protective factor against academic stress and burnout and assists students to be psychologically balanced when they engage in academic activities over a long period of time. This safeguarding factor is especially applicable in the stressful academic environment where students are subjected to constant examinations and performance demands.

To give it a more modern touch, (Antonio & Lucia, 2026)discovered that emotional intelligence remains an important predictor of academic performance, even in the context of dynamics and changes in the educational environment. They draw a conclusion that as the digitalization increases and AI is implemented in education, the role of emotional intelligence will only increase in terms of making sure that students will be able to adapt to new learning systems, learn how to work with automated feedback, and remain emotionally balanced when engaging in self-directed learning. Additionally, the paper observes that EI enables the students to become digitally resilient, which is essential to effectively engage with AI-based learning environments and smart tutoring systems.

Overall, it is evident in the literature reviewed that emotional intelligence is one of the determinants of emotional processes and academic performance of students. It enhances motivation, emotional regulation, resiliency, interpersonal communication and participation in academic behaviors and reduces stress and anxiety related to learning. In the context of artificial intelligence in teaching, EI applies even more, and AI-based systems of learning require students to exercise more self-regulation, flexibility, self-reliance, and emotional sensitivity. In this way, AI-based educational resources can significantly improve academic performance and emotional well-being, which will lead to more effective, personalized, and psychologically supportive learning.

3.2. Academic Engagement and Emotional Intelligence

The emotional intelligence (EI) of students is quite critical in determining their engagement, motivation and overall learning behavior in schools. EI affects how students perceive academic challenges, respond to instructional demands, and remain persistent to learning goals. Students with higher levels of emotional intelligence are more likely to remain focused, regulate their feelings and demonstrate a consistent degree of academic engagement even during difficult or stressful situations. They are better able to cope with distractions, they are able to have a positive attitude towards learning and they are able to be persistent even when they have problems in academics. As a result, EI becomes a key psychological predictor that enables both cognitive and affective elements of learning, enabling students to control emotional well-being and academic achievement and have more stable and productive learning experiences.

(Extremera & Fernández-berrocal, 2006) demonstrate that students with a greater emotional intelligence are better placed to manage academic stress in a more productive way. Based on their results, emotionally intelligent learners are in a position to identify and manage negative emotional states such as anxiety, frustration, and pressure that are likely to be experienced in learning institutions. Such emotional regulation helps students to be psychologically stable during exams, assignments, and performance tests when the stress levels are normally high. In addition, effective emotional management can assist learners to remain calm, reason and solve problems in a more structured manner. The study also indicates that this regulation assists in the improvement of concentration, decision-making skills and problem-solving skills, which are essential to academic success. Through this, EI serves as a buffer that minimizes the negative impact of stress and prevents the learning processes to be derailed by emotional disturbances.

Similarly,(Article, 2025) provide enough evidence that emotional intelligence can assist students in adjusting to school by having the ability to manage their emotions positively and effectively. Their research has revealed that students with higher EI are moveable to regulate their emotional responses, such as anxiety, frustration, and academic uncertainty and this helps them to be more engaged and motivated in their learning. These students will also be more likely to adopt positive learning behaviors, interest in learning activities, and be resilient in the face of challenges. Also, emotional intelligence enhances adaptive learning such as perseverance in demanding tasks, willingness to seek help when needed, and persistence in working towards academic goals. Another observation made by (Shengyao et al., 2024) is that EI can be used to build self-regulated learning strategies, which enable students to plan their learning activities, monitor their progress, and evaluate their performance effectively. This implies that emotional intelligence not only helps in making one emotionally stable but also improves motivational and behavioral aspects of learning that ultimately lead to improved academic adjustment, enhanced engagement and overall academic achievement.(Sridhar et al., n.d.)

4. ROLE OF AI IN SUPPORTING EMOTIONAL PROCESSES

The use of AI in supporting the emotional processes of students is gaining more importance, as it assists in recognizing, analyzing, and responding to the emotional state of students during learning processes. The technology-enhanced learning spaces AI systems are not only to serve the academic content but also be responsive to the emotional state of learners. This is particularly relevant because such feelings as frustration, confusion, anxiety and interest directly affect cognitive engagement, attention span and persistence in learning activities. The detection of such emotional signals can allow AI systems to create more accommodating and sensitive learning environments that can maintain students engaged and prevent the occurrence of negative emotional states that can disrupt learning.

(Bosch et al., 2014) state that AI systems can interpret behavioral patterns of students, such as response time, accuracy, frequency of interactions, and behavior during navigation, to identify emotional states, such as frustration, confusion, boredom, or interest. Based on this discussion, AI systems can provide individualized instructional feedback, such as targeted feedback, step-by-step instructions, motivating messages, or other clarifications. In other cases, such systems may also alter the rate of delivery of the content by slowing down the learning process of the struggling learners or accelerating the learning process of the learners who are demonstrating mastery.

Furthermore, a combination of these emotional detection systems can make AI systems be supportive systems that can enhance the degree of self-awareness in learners. It helps the students to be more conscious of their learning issues and accomplishments when they receive feedback in time and which is conditional on their emotional or cognitive state. This knowledge can facilitate the process of self-reflection that will help the learners to understand when they are experiencing frustration or confusion and apply the corresponding coping or problem solving strategies. Through this, AI is indirectly connected with the development of emotional regulation and metacognition.

Although the AI systems are very helpful in recognizing and responding to emotional states, they cannot replace the human emotional support provided by teachers Human teachers provide emotional support, ethical encouragement, and human connection that cannot be completely simulated by AI. Nevertheless, AI can be used as one more tool that will allow the teacher to track large groups of students at once and detect students who might need further emotional or academic assistance. This scaling enables more efficient and prompt intervention in classrooms.

In addition, AI-based emotional support systems can be used to improve emotional awareness and self-regulation abilities of students with continuous and systematic feedback. Students can learn to be more conscious of the patterns of their emotional responses and alter their learning strategies in the long run. Therefore, AI does not replace human emotional interaction; however, it can significantly help to facilitate emotional responsive learning environments that enhance academic and emotional development.

5. AI TECHNOLOGIES SUPPORTING EMOTIONAL INTELLIGENCE:

Artificial Intelligence (AI) technologies have been slowly emerging to support emotional intelligence in the learning environment with adaptive learning systems, affective computing, and emotion-sensitive analytics. The technologies enable the learning platforms to detect and respond to the emotional state of the students, which enhances emotional awareness, engagement, and self-regulation. According to (Xaveria & Kristianingsih, 2025) systematic review, AI-based adaptive learning systems personalize the instructions based on the performance and interaction patterns of the learners, which can not only positively impact the cognitive outcomes but also assist them in avoiding emotional distress by providing the appropriate level of challenge and support. Such a personalization can be effective in making sure that the students are motivated and emotionally stable in the process of learning.

Furthermore, affective computing is now one of the significant technological spheres where AI systems recognize, process, and respond to human feelings based on multimodal data such as facial expressions, behavioral signals, and interaction patterns. As part of a comprehensive review,(Yuvaraj et al., 2025) note that the use of affective computing in education is significant in terms of emotional engagement, motivation, and satisfaction with learning. Their findings emphasize that emotionally sensitive systems can allow teachers and learning environments to get to know more about the emotional needs of learners, which in their turn can facilitate the establishment of emotionally supportive learning environments, which have a positive effect on academic and psychological performance.

In addition, the possibilities of emotional artificial intelligence systems have demonstrated a significant potential in improving cognitive and affective learning outcomes when emotional support is added to the instructional strategies. (Qi et al., 2025) in a meta-analysis of a large scale found that AI systems with cognitive and emotional support have significantly superior learning outcomes compared to systems with only cognitive considerations. These systems have a direct effect on the development of emotional intelligence as they help the learners to manage achievement related emotional states such as anxiety, frustration and confidence.

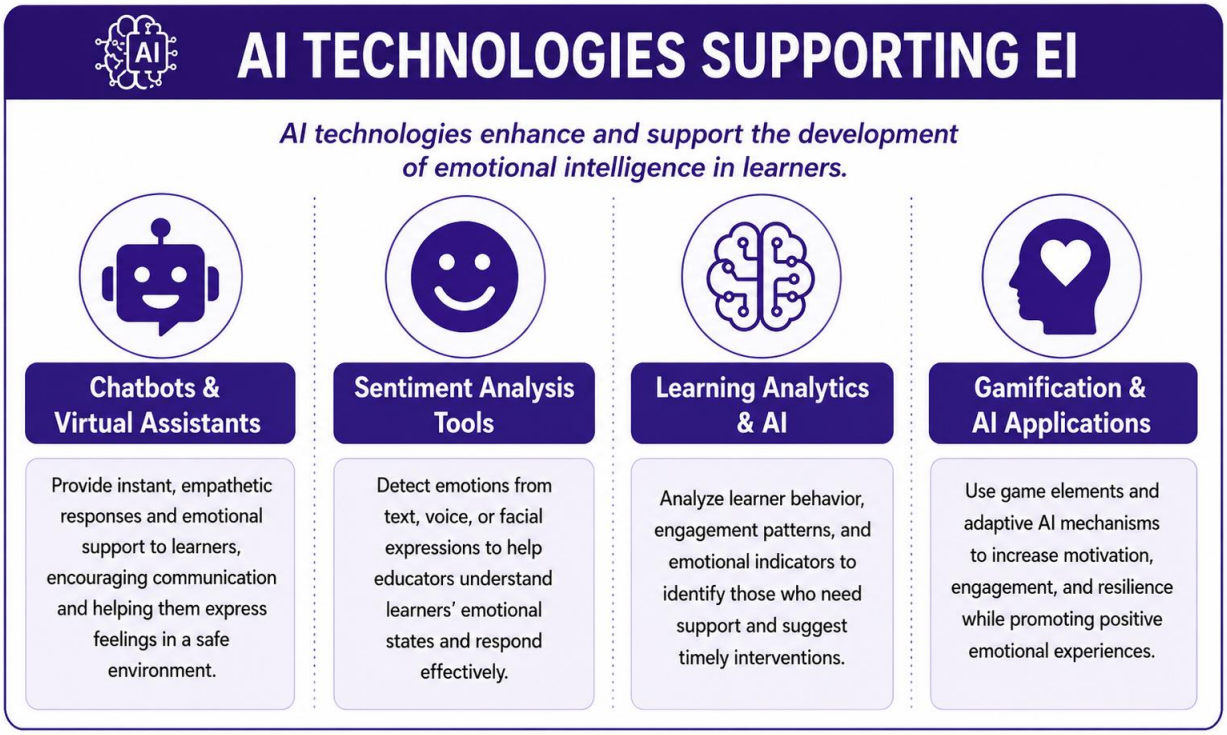
Moreover, recent advances in affective computing in human-computer interaction underline the greater importance of emotional responsiveness in AI systems. The present AI has no longer been a simple emotion recognition tool, as pointed out by (Chen, 2026) but a multimodal emotional analysis tool, which is based on deep learning techniques. As these advances are made, AI systems will be able to provide more specific and context-sensitive emotional support, thereby improving learner engagement and reducing adverse affective reactions, such as boredom and disengagement.

Furthermore, AI-based emotion recognition systems play a critical role in supporting emotional intelligence by real-time monitoring and adaptive interventions.(Deroncele-acosta et al., 2024) demonstrate that AI systems that are capable of analyzing emotional cues based on computer vision and machine learning techniques can be useful in assisting in managing emotions during the learning process. These systems provide timely feedback and responsive measures, which allow the students to manage their emotions and concentrate on learning processes.

The other potential use of AI technologies in the area of emotional intelligence is through the neural network-based affective systems, which enhance emotional interaction and personalization. (Singh & College, n.d.) highlights that the neural network-based affective computing models enable the development of a more interactive and responsive learning process by detecting and comprehending the emotional state of students. This assists in developing emotional awareness and increases the ability of the learners to regulate their emotional responses in their studies.

Finally, more general systematic reviews of AI in education dwell on the fact that emotional and behavioral factors become increasingly included in AI-enhanced learning environments.(Deroncele-acosta et al., 2024) believe that AI technologies can not only increase the efficiency of instruction, but also influence the emotional involvement of students, their motivation, and the process of learning in general. According to their findings, AI-enhanced environments can be used to assist in a more holistic learning process since they are able to address both cognitive and emotional needs of learners.

Overall, the literature demonstrates that AI technologies, such as adaptive learning systems, affective computing, and emotion recognition, can contribute to the establishment of emotional intelligence in the educational sector. The technologies also enhance emotional awareness, self-regulation, and generate motivation and engagement by providing personalized and emotionally responsive learning experiences. Thus, AI plays a significant role in the creation of the holistic learning conditions that include cognitive and emotional development(Akintayo et al., 2024).



Source: Authors own conceptualization

5.1. Intelligent Tutoring Systems (ITS)

Intelligent Tutoring Systems (ITS) are a sophisticated form of artificial intelligence in education that provides a personalized, dynamic and adaptive learning experience, depending on the needs, capabilities and learning pace of a student(Istance & Benavides, n.d.). Unlike in traditional classroom learning where the teaching process is usually standardized, ITS continuously monitor the performance of learners in real-time and analyze the dynamics of interaction, errors, and behavior of response. The systems are capable of pre-processing the challenges of the learners according to this continuous evaluation and offer the specific instructional support in the form of specific hints, step-by-step scaffolding, explanations or corrective feedback. This adaptable teaching model not only enhances cognitive learning, but also plays a significant role in ensuring that the students are emotionally involved, interested and motivated to learn(Istance & Benavides, n.d.).

(Jamil, 2025) notes that ITS contributes significantly to maintaining intrinsic motivation of students by making sure that learning tasks are of optimal difficulty. When the learning activities are not too difficult or too easy, the students will be inclined to remain engaged, keep on solving the problems, believing that they are performing well.

This middle-level of difficulty will help to prevent boredom and disengagement and reduce the feeling of overwhelming and frustration. In this way, ITS create a motivational learning environment that encourages endless effort and increased thinking.

Additionally, ITS facilitates learner control by providing real-time feedback and adaptive instructions, thereby enabling students to control the learning process more. The students get acquainted with ITS and know how to handle the learning resources on their own, apply strategic approaches to problem-solving, and consult when necessary. This feeling of increased control results in a reduction in academic frustration and anxiety, and simultaneously, the enhancement of positive emotional states of confidence, curiosity, and interest. According to (Jamil, 2025), this form of adaptive systems does not just improve academic performance, but also emotional stability since they help the learners to manage negative emotions in response to challenging learning activities.

Furthermore, ITS facilitate the process of self-regulated learning by introducing structured scaffolding procedures that assist students in the process of setting goals, modifying strategies, and thinking reflexively. Where learners are found to exhibit any of the symptoms of hesitation, repetition or withdrawal of activities, ITS can detect the behavioral indicators and respond by offering appropriate cues, hints or motivational messages. These adaptive interventions help students to re-engage in the learning process, remain focused and resilient to emotional difficulties when faced with academic difficulties. This unremitting support augments the ability of students to be in a position to regulate their cognitive tactics besides their emotional responses in the long run.

Moreover, the interaction and feedback between learners that can facilitate constructive communication and emotional support can also be enhanced by ITS that tracks peer interactions and gives feedback. These systems can identify imbalances of participation or adverse patterns of interaction and interfere in group-based learning activities through promoting inclusive dialogue and collaborative interaction. This contributes to development of social-emotional skills such as teamwork and good peer relations, empathy.

In total, Intelligent Tutoring Systems serve as a moderator between cognitive and emotional learning since it is a mixture of academic instruction and emotional attentiveness. They offer a learning environment where students feel motivated, empowered and emotionally engaged and at the same time improve on their academic knowledge and problem solving abilities. In this way, ITS will not only enhance the efficiency of learning, but also significantly contribute to the emotional state of students and their motivation to study in the long run.

5.2. Emotional AI / Affective Computing

Affective computing or emotion-conscious artificial intelligence is a recent branch of educational technology that concerns the identification, perception, and response of the emotional state of students during the learning process. These systems use a range of data sources such as facial expression, speech patterns and textual input to determine emotional states such as confusion, frustration, boredom, satisfaction or engagement. By processing these affective cues, AI systems can generate real-time feedback, which can adjust learning instructions and provide personalized learning resources. The skill will enhance the overall learning experience by making it personalized, more engaging, motivational and ultimately achieving better academic outcomes.

By integrating the affective data in the instructional design, the AI systems can modify the learning paths dynamically in relation to the emotional requirements of the students. To illustrate this, the system is able to offer additional explanations, simplified content or motivational cues when the learners show indications of frustration or cognitive overload. Conversely, the system may also have more challenging activities in case the students show interest or activity to sustain motivation and cognitive growth. This sensitivity enables the learning process to be emotionally balanced and cognitively appropriate to the individual learners, and hence reduces the dropout rates and increases persistence in learning processes.

(Banihashem et al., 2025) were able to find out that the use of emotion recognition technologies in AI-powered classrooms significantly positively influenced student engagement and motivation in a study carried out on 250 undergraduate and postgraduate students. The study reveals that learners in emotionally adaptive environments are more likely to participate in learning processes and activities, enjoy longer attention span and are more interested in their studies. The findings reveal that affective AI systems play an important role in enhancing the emotional dimension of learning that has a direct impact on the academic performance.

In addition, these systems are supportive systems which do not replace the role of human teachers but complement the role of human teachers. According to (Park et al., 2023) affective AI provides the possibility to monitor the emotional state of students at any moment and provides them with adaptive interventions, such as contextual hints, encouraging feedback, or task modifications. These interventions can be helpful in reduction of negative emotional states such as frustration and disengagement, and in the same breath, increase positive emotional states such as confidence and curiosity. As a result, teachers will be better equipped to address the needs of individual students, particularly in large or digitally mediated classes where it may not be feasible to have human supervision at all times.

Furthermore, the emotional-conscious AI may be used to create social-emotional learning by analyzing emotional dynamics within groups and emotional classroom climates. These systems can be used to identify trends of emotional interaction among students and encourage positive peer communication, collaborative interaction and conflict resolution. Facilitative interaction between learners can be achieved by using affective AI and hence, create a more inclusive and emotionally safe learning environment, which is essential to effective collaborative learning.

(Kuai et al., 2025)Huang et al. (2025) are also of the opinion that learners who have the belief that AI systems are responsive, supportive and emotionally sensitive are likely to exhibit greater motivation, persistence and engagement in learning activities. This perception of emotional responsiveness creates trust in the learning system among the students and makes them more motivated to be active participants in the academic activities. The article emphasizes that affective AI is not only useful in improving cognitive learning performance but also in shaping the emotional experience of the students in the online learning environment.

In sum, affective computing is a significant advancement in the sphere of artificial intelligence in education that entails emotional sensitivity into teaching. It assists in developing emotionally sensitive learning conditions that promote academic performance and emotional health. Affective AI can be developed by combining adaptive teaching and real-time emotional recognition to provide students with holistic learning experiences, where they feel supported, understood, and motivated, which can lead to cognitive and emotional development.

6.IMPACT OF AI ON STUDENTS' EMOTIONAL INTELLIGENCE:

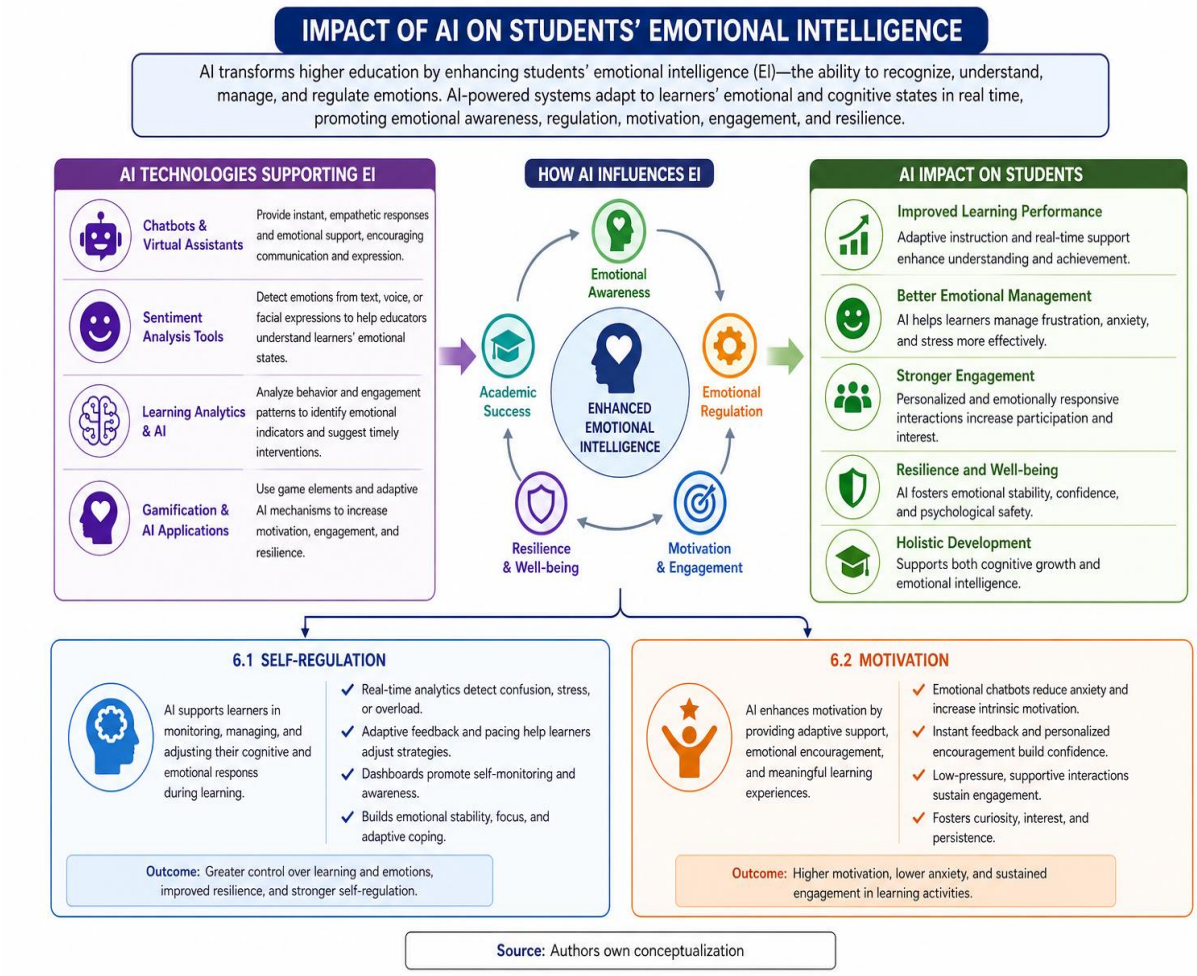
Artificial Intelligence (AI) is changing the landscape of higher education in that it is not only influencing the cognitive learning performance of the students but also their emotional intelligence (EI). The ability to identify, understand, manage, and channel emotions in a positive way is known as emotional intelligence and is a significant aspect in sustaining academic interest, motivation, resilience, and mental health. In AI-assisted learning, emotional intelligence is continuously evolved in adaptive systems responding to the emotional and cognitive conditions of learners on a real-time basis(Ahmed & Shah, 2019).

The recent open-access research indicates that emotional AI systems can significantly enhance the performance of learning and emotional engagement by integrating emotional detection and adaptive teaching. These systems identify emotional conditions of learners (confusion, frustration, boredom, and engagement) based on multimodal sources of data, and generate appropriate interventions (feedback, hints, encouragement, or task adjustments). This real-time responsiveness helps the students to control their emotions more effectively and remain focused when engaging in learning activities. Therefore, AI assists in improving emotional awareness, improving emotional regulation, and sustaining academic engagement. (Ye et al., 2025) In a similar manner, AI-based learning programs affect the emotional experiences of learners by establishing how they respond to learning processes in terms of curiosity, anxiety, motivation, and creativity. On the one hand, AI makes a positive impact on the organized and individual learning process; on the other hand, it changes the emotional conditions, making the learning process more exciting and less unpredictable. (Lin & Chen, 2024).

Other statistics show that AI-powered chatbot systems directly influence the development of emotional intelligence since they influence the expression and management of emotions in the course of academic activities. These systems are interactive and help learners to express themselves, deal with emotional stress, and make better decisions regarding learning. Students will be more emotionally aware and learn to manage frustration and confusion in the learning process by engaging with AI chatbots on a regular basis. This illustrates that AI is not only a cognitive support system but also an emotional learning system. (Kazazoglu & Özel, 2025) continue to note that affective computing models are increasingly sensitive to detecting emotional expressions in the form of facial expression, tone of voice, and behavioral patterns. Based on this identification, AI systems will provide real-time cognitive and emotional support which will enhance student engagement and reduce emotional stress. The systems assist in the creation of emotionally adaptive learning environments where students feel that they are always guided and supported in the learning process. (Aristeidou & Aristidou, 2023).

Moreover, research on chatbots in teaching shows that emotional responsive AI systems can significantly enhance student motivation and engagement. By interacting with positive AI systems, learners will be more likely to experience less negative affect, such as anxiety and frustration, and feel more confident and motivated. This encourages persistence in learning processes and encourages long-term scholarly effort**.** (Yin et al., 2024) In addition, perceived support, emotional comfort, and trust in the AI-based learning system are psychological factors that influence emotional responses of students to the system. These are the main points that determine how learners will cope with their emotions and how they will engage with AI-assisted education.(Icmusted et al., 2025) further In addition, AI-based learning applications have been found to influence academic emotions such as curiosity, stress, and confidence, which directly influence the emotional experience of students in the learning process. Even though AI can enhance the structured learning and problem-solving abilities, it also changes the emotional responses, turning the learning process into more interactive and flexible. (Lin & Chen, 2024)

Overall, the literature demonstrates that the impact of AI on the emotional intelligence of students is multidimensional because it facilitates emotional awareness, assists students to control their emotions, and changes the nature of interactions with emotions during learning processes. However, despite these benefits, AI systems remain to be computational and cannot be entirely empathetic, morally conscious, and emotionally profound as humans are. Therefore, AI may be viewed as a supportive system that will not substitute but can support human emotional involvement in education. Properly applied AI can significantly enhance the growth of emotional intelligence, by supporting self-regulation, motivation, resilience, and adaptive learning behaviors, and ultimately, the growth of more holistic cognitive and emotional growth in students.



6.1. Self-Regulation

Self-regulation is the ability of learners to be consciously aware, control and adjust their cognitive and emotional responses, particularly when they are confronted with academic challenges, uncertainty, or complex learning tasks. It is a process of constant self-understanding, self-assessment and behavioral change, which enables students to be focused, motivated and emotionally stable in the process of learning. Self-regulated learning is an essential educational psychology competence that directly influences academic achievement, perseverance, and emotional well-being.

Guided learning, real-time learning analytics and tailored feedback are all intelligent systems that can significantly support self-regulation in AI-enhanced learning environments. These AI devices follow the dynamics of interactions involving the students, their performance patterns, and involvement rates to detect the signs of confusion, disengagement, and cognitive overload. This data is used to give adaptive interventions to help students modify their learning strategies, rethink concepts, or alter their learning pace. Such dynamic support system enables learners to have more control over the learning process and also be more aware of their emotional and mental states.

(Li et al., 2026) state that adaptive feedback mechanisms and AI-based progress monitoring systems are important in promoting cognitive and emotional self-regulation. Their results show that students will be able to identify their learning issues and change their approach to them more efficiently when they are provided with feedback in a timely and personalized manner. Better still, emotional reactions can be addressed as well with the help of such systems, which minimize the frustration, anxiety, and academic stress. Constant mentoring and support will help the students to feel more emotionally stable and confident in their ability to cope

with difficult tasks. This proves the fact that AI is not just capable of facilitating the learning strategies but it is directly engaged in the emotional regulation processes that are directly connected to the development of emotional intelligence.

On the same note,(Banihashem et al., 2025) in their systematic mapping research note that AI-based personalization, adaptive pacing, and feedback dashboards can significantly improve autonomy and emotional stability of learners. They find that individualized learning experiences assist students to learn at their pace, which lightens cognitive load and academic stress. Adaptive dashboards also enable the learners to track their progress and know which areas they need to improve as they give them clear visual feedback on their progress. This heightened consciousness leads to the feeling of control of learning that is fundamental to self-regulation and emotional strength.

In addition,(Banihashem et al., 2025) observe that AI-assisted systems can assist students to acquire more effective coping strategies to academic stressors by offering them structured learning experiences and offering them continuous emotional and cognitive feedback. This means that students will not feel frustrated and disengaged as much and have a higher chance of being motivated and persistent in their learning activities. This helps in the development of emotional intelligence since it enhances the capacity of learners to manage emotions, be focused in stressful conditions and adjust well to academic stress.

In general, as the literature suggests, AI-driven educational systems play an important role in the development of self-regulated learning with cognitive monitoring and emotional support systems(Lan, 2025). The implementation of AI systems can help students to better organize their learning strategies and emotional reactions, providing real-time feedback, adaptive learning paths, and individual instructional support. Self-regulation within AI-assisted settings, in its turn, does not only enhance academic achievement but also leads to the emergence of emotional intelligence, as it creates emotional awareness, emotional stability, and adaptive coping strategies.

6.2. Motivation

Technology-enhanced learning motivation is an important factor in guaranteeing student interest, perseverance and academic performance(*BG Research Online*, 2019). It is also common knowledge that it is one of the greatest emotional and psychological motivators that determine how learners initiate, guide and even maintain learning behaviors. The concept of motivation as applied to artificial intelligence in the learning process can be radically enhanced by introducing AI-based solutions providing adaptive scaffolding, real-time feedback, and responsive interactions. Such systems help in creating a more interactive and friendly learning environment, which encourages the learners to be more actively involved in their studies.

The educational systems created with the assistance of AI contribute to the formation of motivation because they enable students to have personal learning experiences, which are applicable to their needs and emotional states(Deroncele-acosta et al., 2024). The adaptive scaffolding ensures that learning activities are neither too difficult nor too simple and therefore a good level of difficulty that retains the interest and reduces the cognitive loads. In addition, AI will be able to provide students with feedback all the time, allowing them to understand their progress, areas of improvement, and feel some achievement. Emotional or affective responses elicited by AI systems also enhance the learning experience as it creates a sense of interaction and support, which positively influences the emotional engagement of students(Guo & Wang, 2025).

(Yin et al., 2024) found out that emotional chatbots that create positive emotional reactions can substantially increase intrinsic motivation of students and reduce anxiety and disengagement. They find that when AI systems provide positive, supportive, and emotionally sensitive communication, students will be more comfortable and confident in their learning process. This emotional comfort will reduce the fear of failure and encourage learners to persist with difficult tasks and this develops their intrinsic motivation. The findings highlight the idea that emotionally intelligent AI systems could become a significant contributor to the emergence of positive attitudes towards learning and long-term engagement.

Similarly, (Yuvaraj et al., 2025) emphasize that AI-based chatbots contribute to student motivation by offering immediate feedback, individualized encouragement, and stress-free learning opportunities. These systems according to their studies have proved to be effective particularly in self directed and online learning environments where students are likely to feel isolated, unmotivated and uninteracted with teachers. By responding in time and providing effective communication, AI chatbots help the learners feel instructed and emotionally encouraged, which increases their motivation to proceed with the learning activities.

Such interaction also reduces performance anxiety and offers a psychologically safe learning environment, which encourages exploration and involvement.

Furthermore, the findings of (Yin et al., 2024) (Kuai et al., 2025) are synthesized to suggest the notion that AI systems are emotional motivation that enhances the continuation and engagement of students in the academic process. Integrating emotional responsiveness and instructional support, AI technologies can help learners to overcome negative emotions (frustration and anxiety) and to enhance positive ones (confidence, curiosity, and interest). Overall, the literature demonstrates that artificial intelligence is a key factor in improving student motivation, integrating adaptive learning systems with emotional support systems. Not only are AI-based tools more efficient at boosting cognitive engagement, but emotional motivators as well, which enable students to be persistent and resilient and remain engaged in the learning process despite academic obstacles. This demonstrates that motivation in the context of AI-based learning is intimately connected with emotional intelligence, and AI is a powerful tool to support long-term and significant learning experiences.

7.EFFECT ON STUDENT LEARNING OUTCOMES

Academic interaction and achievement can get a significant boost with the help of Artificial Intelligence (AI) services since they may satisfy both cognitive and emotional learning requirements. In the modern day learning environment, learning does not just hinge on the content being presented but on how well the students are able to be emotionally and cognitively engaged in the learning process. This integration can be facilitated by the AI-based systems which are able to provide adaptive learning pathways, personalized feedback, and interactive learning experiences that can be responsive to the needs of individual learners. These attributes come in handy in creating a leveled learning environment where the students can develop academic competence and emotional stability.

According to(Ahmed Dahri et al., 2025) **,**adaptive challenges and reward systems in gamified AI learning environments are important in improving student learning and engagement. Their findings suggest that learners will be more motivated and will be more engaged when they are introduced to challenges in the form of tasks that are challenging enough and timely rewarded or provided with feedback. The gamified format enhanced the learning experience by making it more interactive, goal-focused, and emotionally involved, which enhances academic performance and satisfaction among learners.

Equally,(Shao et al., 2025) (Banihashem et al., 2025)find that AI-based learning tools can have a positive impact on student participation, engagement, and confidence in a substantial manner. According to their results, students will be more ready to engage in learning processes when they use AI-based learning systems as they will be able to receive real-time feedback and individualized instructional support. Moreover, these systems encourage emotional involvement since they provide a conducive learning environment where students feel tutored and not lonely**.**(Guo & Wang, 2025) also underline that emotional intelligence mediates academic performance and state that students with a high level of emotional intelligence can utilize AI tools more effectively, manage their emotions, and redirect engagement to academic performance.

In addition to improving interaction, AI is also important in alleviating academic stress and anxiety in learners. According to (Lodge et al., 2018)**,** confusion can be minimized through the assistance of adaptive feedback systems that offer clarification and guidance timely when undertaking learning tasks. This lessens mental load and emotional stress and this assists students to be focused and confident as they go through complicated academic content. The AI systems also help in avoiding frustrations by rectifying misconceptions in real-time and hence learn easier.

Moreover(Arguel et al., 2017) also highlight that emotion-sensitive AI systems have a positive impact on academic and emotional well-being because of the responsive feedback that varies in response to cognitive and emotional states of students. These systems assist learners to feel more empathized and supported, which is one of the factors that contribute to emotional resilience and motivates learners to continue with the completion of learning tasks. Consequently, the students will feel less anxiety and will be more emotionally stable, the key to the long-term engagement in academics.

On the whole, the literature suggests that AI-powered education systems can have a tremendous positive impact on academic engagement and academic performance due to the combination of cognitive support and emotional attentiveness. The AI decreases stress, enhances confidence, and leads to emotional engagement through adaptive challenges, gamified learning models, real-time feedback, and emotion-sensitive interventions. Therefore, artificial intelligence does not only enhance academic performance, but also provokes emotional intelligence, well being, and long-term learning outcomes of students.

8.RESEARCH METHODOLOGY:

The current study requires the qualitative systematic literature review (SLR), which would allow exploring the effects of AI on the emotional intelligence and learning outcomes of students. For this reason, the SLR relies upon the systematic search and analysis of the existing literature, which includes peer-reviewed articles and scholarly papers on AI applications to the sphere of education, specifically to topics of emotional intelligence and intelligent tutoring systems as well as affective computing. For the purposes of the review, the thematic analysis approach would be applied, which means that the key themes related to the topic would be identified and analyzed. Among such themes are: emotional regulation, motivation, self-regulation, adaptive feedback and learning engagement. The selection of scholarly articles for further analysis would be done according to their topicality, as it is important to discuss the application of AI to education in terms of emotional and cognitive outcomes.

9.RESEARCH GAP:

Although the Artificial Intelligence (AI) is popular in the field of education, most of the existing research is centered on the cognitive aspects of learning, such as academic success, learning effectiveness, and skill development, but the emotional aspects of learning are not well studied. In particular, there is a lack of research that methodically examines the impact of AI on the formation of emotional intelligence of students, including emotional awareness, emotional regulation, empathy, and long-term emotional stability. Despite the studies on intelligent tutoring systems, affective computing, and AI-based feedback systems, there is little to integrate the technologies to understand the combined impact of these technologies on emotional intelligence as a complete construct. Furthermore, the literature is typically founded on the short-term learning benefits, and there is no longitudinal information on how the regular exposure to AI-driven learning settings can affect the emotional development of the students in the long-term. There are other ethical considerations, such as emotional data surveillance, privacy concerns, and psychological concerns of emotion sensitive AI systems, which are not sufficiently addressed in terms of emotional intelligence outcomes. In this way, the disjunction between AI-based educational technologies and their impact on emotional and academic development of learners is clear and needs to be research-intensive.

10.SUMMARY

This research paper has analyzed how Artificial Intelligence (AI) has impacted emotional intelligence and academic performance of school children. The literature suggests that AI plays a significant role in transforming learning environments using adaptive learning systems, intelligent tutoring systems, affective computing, and AI-powered feedback systems. These technologies may be employed to enhance the learning process of students by providing students with customized instruction, immediate feedback, and ongoing academic support, which will boost engagement and academic performance.

Another positive effect of AI on students emotional intelligence highlighted in the review is that AI can assist students in controlling their emotions, motivate them, learn self-regulatory, and become emotionally involved. The use of AI-based applications can help the learners to identify and manage emotional reactions of stress, frustration, and anxiety, and develop confidence, perseverance, and interest in the learning process. However, despite these benefits, AI is not going to replace human emotional involvement, empathy, and moral counseling provided by teachers altogether. Lastly, AI influences education in a multidimensional manner by integrating the emotional and cognitive support systems. Appropriate use of AI has a positive impact on academic performance, and emotional intelligence, which encourages the overall holistic development of learners in modern learning environments.

11.CONCLUSION:

The application of Artificial Intelligence (AI) to educational processes demonstrates that it positively and transformative impacts the emotional intelligence of students. The educational systems based on AI enhance self-regulation, motivation, and emotional engagement of students with adaptive feedback, individualized learning routes, and continuous learning assistance. These intelligent systems enable the learners to be more conscious of their emotional states, alter learning plans in response, and remain engaged even in challenging academic situations. As a result, AI does not only result in improved academic performance but also improves emotional competencies, which play a key role in lifelong learning.

AI systems that are sensitive to emotions also support the learners by identifying and responding to the negative emotional states such as frustration, stress and anxiety. These systems are capable of promoting psychological stability through decreasing emotional overload and supporting it via real-time interventions such as feedback, scaffolding, encouragement, and task adaptation. Such responsiveness results in resilience among the students who are able to proceed to learn tasks more confidently and less emotionally distressed. In its turn, AI assists in creating more comfortable and emotionally balanced learning environments that enhance academic success and emotional well-being.

However, despite all these benefits, AI is not directed at the replacement of human teachers. Human teachers play a crucial role in providing empathy, moral support and complex emotional understanding which AI systems cannot fully duplicate. Instead, AI may be considered an additional tool that can be used to supplement the human emotional thinking and advance the practice of teaching. The implementation of AI in the education sector should therefore be designed in such a way that it supports, but does not eliminate, the emotional and pedagogical roles of the teacher.

In the meantime, it is important to use AI responsibly in education. The issues of data privacy, ethical use of student information, and bias in algorithms should be addressed in detail to offer a fair, transparent, and trust in AI systems. Without proper protection, the benefits of AI may be undermined by the ethical and security concerns that may negatively affect the experiences of learners.

Overall, the implementation of emotional intelligence in AI-driven education systems has a tremendous potential to facilitate the comprehensive development of students. AI can create an academic and emotional success through cognitive support and emotional responsiveness, which creates learning environments. Therefore, the moral and humane use of AI in education can contribute to shaping the entire cognitive, emotional, and psychological development of the students and prepare them to the academic and professional challenges of the future.

REFERENCES:

[1] Ahmed Dahri, N., Yahaya, N., Mugahed Al-Rahmi, W., Almuqren, L., Almgren, A. S., Alshimai, A., & Samed Al-Adwan, A. (2025). The Effect of AI Gamification on Students' Engagement and Academic Achievement in Malaysia: SEM Analysis Perspectives. *IEEE Access*, *13*(February), 70791–70810. https://doi.org/10.1109/ACCESS.2025.3560567

[2] Ahmed, H., & Shah, S. M. (2019). *Burnout Among Business Students and Its Impact On Academic Performance*. *1*(1), 37–45.

[3] Akintayo, O. T., Eden, C. A., & Ayeni, O. O. (2024). *Integrating AI with emotional and social learning in primary education : Developing a holistic adaptive learning ecosystem*.

[4] Antonio, A. C., & Lucia, C. (2026). *Academic Performance in Times of Change : The Role of*.

[5] Arguel, A., Lockyer, L., Lipp, O. V., Lodge, J. M., & Kennedy, G. (2017). Inside Out: Detecting Learners' Confusion to Improve Interactive Digital Learning Environments. *Journal of Educational Computing Research*, *55*(4), 526–551. https://doi.org/10.1177/0735633116674732

[6] Aristeidou, M., & Aristidou, A. (2023). *Research disruption during PhD studies and its impact on mental health : Implications for research and university policy*. 1–21. https://doi.org/10.1371/journal.pone.0291555

[7] Article, O. (2025). *Optimizing academic achievement : The synergetic effects of emotional intelligence and psychological capital*. 1–9. https://doi.org/10.4103/jehp.jehp

[8] Banihashem, S. K., Bond, M., Bergdahl, N., Khosravi, H., & Noroozi, O. (2025). A systematic mapping review at the intersection of artificial intelligence and self-regulated learning. *International Journal of Educational Technology in Higher Education*, *22*(1). https://doi.org/10.1186/s41239-025-00548-8

[9] *BG Research Online*. (2019). *April*, 104–113.

[10] Bosch, N., Mello, S. K. D., Dame, N., Dame, N., Baker, R. S., Shute, V., Ventura, M., & Zhao, W. (2014). *Bosch et al. - Detecting Student Emotions in Computer-Enabled Cla*.

[11] Chen, T. (2026). *A Review of Affective Computing in Human-Computer Interaction Design*. *22*(1), 1–25. https://doi.org/10.4018/IJDWM.402195

[12] Deroncele-acosta, A., Luis, J., Ayala, M., & Barrasa, A. (2024). *Integrating artificial intelligence to assess emotions in learning environments : a systematic literature review*. *June*. https://doi.org/10.3389/fpsyg.2024.1387089

[13] Dhanasekaran, R., & Thavaraj, S. (2024). *Emotional-Intelligence-Front*.

[14] Environments, L., Lin, C. C., Huang, A. Y. Q., & Lu, O. H. T. (2023). Artificial intelligence in intelligent tutoring systems toward sustainable education : a systematic review. *Smart Learning Environments*. https://doi.org/10.1186/s40561-023-00260-y

[15] Extremera, N., & Fernández-berrocal, P. (2006). Emotional Intelligence as Predictor of Mental, Social,. *The Spanish Journal of Psychology*, *9*(1), 45–51.

[16] Garzón, J., Patiño, E., & Marulanda, C. (2025). Systematic Review of Artificial Intelligence in Education: Trends, Benefits, and Challenges. *Multimodal Technologies and Interaction*, *9*(8), 1–19. https://doi.org/10.3390/mti9080084

[17] Gregory, G., & Kaufeldt, M. (2010). *Motivated Brain Self-Efficacy The Yerkes-Dodson Law of Arousal*.

[18] Guo, Y., & Wang, Y. (2025). Exploring the Effects of Artificial Intelligence Application on EFL Students' Academic Engagement and Emotional Experiences: A Mixed-Methods Study. *European Journal of Education*, *60*(1), 1–15. https://doi.org/10.1111/ejed.12812

[19] Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. T., Cukurova, M., Bittencourt, I. I., & Koedinger, K. R. (2022). Ethics of AI in Education: Towards a Community-Wide Framework. *International Journal of Artificial Intelligence in Education*, *32*(3), 504–526. https://doi.org/10.1007/s40593-021-00239-1

[20] Icmusted, T. D., Dagtekin, E., & Erkalkan, E. (2025). *2nd International Conference on Multidisciplinary Sciences Psychological Factors Influencing University Students ' Trust in AI-Based Learning Assistants*. *Icmusted*, 157–162.

[21] Indhirapratha, M. S., Samuel Thavaraj, H., & Seema, V. (2024). *EPRA International Journal of Research and Development (IJRD) STUDENTS: A GLOBAL REVIEW*. *7838*(August), 2016–2019. https://doi.org/10.36713/epra2016

[22] Istance, D., & Benavides, F. (n.d.). *The Nature of Learning*.

[23] Jamil, R. (2025). *Dialogue Social Science Review (DSSR) in University Students of Pakistan Dialogue Social Science Review (DSSR)*. *3*(3), 455–466.

[24] Kariippanon, K. E., Cliff, D. P., Lancaster, S. L., & Parrish, A. D. O. A. (2017). and teaching , learning and student wellbeing. *Learning Environments Research*. https://doi.org/10.1007/s10984-017-9254-9

[25] Kazazoglu, S., & Özel, G. T. (2025). *The impact of chatbots on emotional intelligence in AI-assisted EFL writing*. *November*, 1–16. https://doi.org/10.3389/feduc.2025.1624272

[26] Kim, J. (2023). Leading teachers ' perspective on teacher - AI collaboration in education. In *Education and Information Technologies* (Issue 0123456789). Springer US. https://doi.org/10.1007/s10639-023-12109-5

[27] King, R. B., Chung, T. S. H., & Chen, J. (2020). *Emotionally intelligent students are more engaged and successful : examining the role of emotional intelligence in higher education*.

[28] Kingdom, U. (2024). *The Importance of Emotional Intelligence in Student Development*. *10*(2), 13–14. https://doi.org/10.4172/JES.10.02.007

[29] Kuai, H., Huang, J. X., Tao, X., Pasi, G., & Yao, Y. (2025). *World To Create a Future Intelligent Society*. 1–50.

[30] Lan, M. (2025). A qualitative systematic review on AI empowered self-regulated learning in higher education. *Npj Science of Learning*, 1–16. https://doi.org/10.1038/s41539-025-00319-0

[31] Li, X., Li, H., Hwang, J., & Gao, W. (2026). *The impact of perceived social support on athletic engagement among elite track and field athletes : an integrated perspective based on self-determination theory and social resources theory*. *January*. https://doi.org/10.3389/fpsyg.2026.1763813

[32] Lin, H., & Chen, Q. (2024). *Artificial intelligence (AI) -integrated educational applications and college students ' creativity and academic emotions : students and teachers ' perceptions and attitudes*.

[33] Lodge, J. M., Kennedy, G., Lockyer, L., Arguel, A., & Pachman, M. (2018). Understanding Difficulties and Resulting Confusion in Learning: An Integrative Review. *Frontiers in Education*, *3*(June), 1–10. https://doi.org/10.3389/feduc.2018.00049

[34] MAVROU, M. (2024). EMOTIONAL INTELLIGENCE. *Open Schools Journal for Open Science*, *7*(2 SE-Greece). https://doi.org/10.12681/osj.39504

[35] Mayer, J. D., Salovey, P., & Caruso, D. R. (2008). Emotional Intelligence: New Ability or Eclectic Traits? *American Psychologist*, *63*(6), 503–517. https://doi.org/10.1037/0003-066X.63.6.503

[36] Park, J. S., Lee, D. G., Jimenez, J. A., Lee, S. J., & Kim, J. W. (2023). Human-Focused Digital Twin Applications for Occupational Safety and Health in Workplaces: A Brief Survey and Research Directions. In *Applied Sciences (Switzerland)* (Vol. 13, Issue 7). MDPI. https://doi.org/10.3390/app13074598

[37] Pathinettampadiyan, B., & Thavaraj, H. S. (2025). *The role of emotional intelligence in enhancing entrepreneurial performance : A global literature review*.

[38] Petrides, K. V., Mikolajczak, M., Mavroveli, S., Sanchez-Ruiz, M. J., Furnham, A., & Pérez-González, J. C. (2016). Developments in Trait Emotional Intelligence Research. *Emotion Review*, *8*(4), 335–341. https://doi.org/10.1177/1754073916650493

[39] Qi, Y., Manchuk, V., Korylchuk, N., & Kabitska, O. (2025). *Students ' Coping Strategies in Response to Academic Stress : A Study of Psychological Mechanisms and Their Effects on Adaptation*. *3*, 24–45.

[40] Romanelli, F., Cain, J., & Smith, K. M. (2006). *Emotional Intelligence as a Predictor of Academic and / or Professional Success*. *70*(3).

[41] Salloum, S. A., Alomari, K. M., Alfaisal, A. M., Aljanada, R. A., & Basiouni, A. (2025). Emotion recognition for enhanced learning: using AI to detect students' emotions and adjust teaching methods. *Smart Learning Environments*, *12*(1). https://doi.org/10.1186/s40561-025-00374-5

[42] Shao, Y., Wu, J., Li, Y., Lu, Q., & Wang, Z. (2025). The impact of digital technology use on EFL students' English academic performance: The mediating roles of emotional intelligence and learning engagement. *BMC Psychology*, *13*(1). https://doi.org/10.1186/s40359-025-02967-8

[43] Shengyao, Y., Xuefen, L., Jenatabadi, H. S., Samsudin, N., Chunchun, K., & Ishak, Z. (2024). *Emotional intelligence impact on academic achievement and psychological well-being among university students : the mediating role of positive psychological characteristics*. 1–17.

[44] Singh, A., & College, B. N. (n.d.). *Neural Network-Based Affective Computing for Education*. 1–19.

[45] Sridhar, G., Time, F., & Industries, R. (n.d.). *Industry 5 . 0 : A Shift towards Human-Centric Industrial Transformation*.

[46] Sternberg, R. J. (2019). A theory of adaptive intelligence and its relation to general intelligence. *Journal of Intelligence*, *7*(4), 1–17. https://doi.org/10.3390/jintelligence7040023

[47] Tuomi, I. (2022). *Artificial intelligence , 21st century competences , emotional learning in education : More than high- -*. 1–19. https://doi.org/10.1111/ejed.12531

[48] Xaveria, F., & Kristianingsih, D. (2025). *Artificial intelligence in adaptive education : a systematic review of techniques for personalized learning*.

[49] Ye, L., Li, Y., & Zhang, N. (2025). *The impact of aesthetic education on university students ' psychological wellbeing : exploring mediating and moderating effects*. *March*, 1–13. https://doi.org/10.3389/fpsyg.2025.1515671

[50] Yin, J., Goh, T. T., & Hu, Y. (2024). Interactions with educational chatbots: the impact of induced emotions and students' learning motivation. *International Journal of Educational Technology in Higher Education*, *21*(1). https://doi.org/10.1186/s41239-024-00480-3

[51] Yuvaraj, R., Mittal, R., Prince, A. A., & Huang, J. S. (2025). Affective Computing for Learning in Education: A Systematic Review and Bibliometric Analysis. *Education Sciences*, *15*(1). https://doi.org/10.3390/educsci15010065

[52] Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0171-0

[53] Zhang, S., Rehman, S., Zhao, Y., Rehman, E., & Yaqoob, B. (2024). *Exploring the interplay of academic stress , motivation , emotional intelligence , and mindfulness in higher education : a longitudinal cross-lagged panel model approach*.

[54] Zhou, Z., Tavan, H., Kavarizadeh, F., Sarokhani, M., & Sayehmiri, K. (2024). *The relationship between emotional intelligence , spiritual intelligence , and student achievement : a systematic review and meta- analysis*. 1–10.