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THE INFLUENCE OF ARTIFICIAL INTELLIGENCE ON STUDENTS' EMOTIONS

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Abstract

Artificial intelligence (AI) is increasingly being integrated into modern education, transforming teaching, learning, and assessment methods. Beyond its evident cognitive benefits, AI also significantly impacts students' emotional development, including motivation, stress, sense of belonging, and empathy. This paper examines the complex relationship between the use of AI in teaching and students' emotions, presenting both positive and negative aspects, psychological and pedagogical implications, as well as recommendations for ethical and effective implementation.

Keywords: *Artificial intelligence, Education, Student emotions, Motivation, Stress, Emotional intelligence, Pedagogical implications, Digital literacy, Critical thinking, AI in teaching*

1. Introduction

The last decade has brought dramatic technological changes to the educational process. Artificial intelligence, initially applied in industrial, medical, and technological sectors, is now playing an increasingly prominent role in curricula, digital platforms, and learning applications. AI enables personalized teaching content, automated assessment, interactive simulations, and adaptive learning, but it also affects students' emotional states.

Research in educational psychology shows that emotions are a key factor for effective learning—positive emotions such as joy, curiosity, and enthusiasm increase motivation and improve memory retention, while fear, stress, and frustration can hinder knowledge acquisition. The way AI is integrated into teaching often determines students' emotional responses.

2. Positive emotional effects

2.1. Increased motivation and engagement

AI tools, through adaptive pacing, relevant content, and interactive activities, create a sense of individual care for each student (Johnson & Lester, 2021). Personalized approaches allow students to work according to their abilities, which increases intrinsic motivation and reduces the risk of frustration from tasks that are too easy or too difficult (Deci & Ryan, 2000). For example, an application that automatically adjusts task difficulty based on student performance provides a continuous sense of progress and maintains interest.

2.2. Encouraging creativity

Generative models allow students to create texts, images, musical compositions, or even interactive stories (McCormack, Gifford & Hutchings, 2019). This process not only develops a sense of achievement but also enhances creative self-confidence (Runco & Jaeger, 2012). For instance, when writing an essay, a student may receive suggestions for character development or plot ideas, helping them think more broadly and explore multiple styles.

2.3. Support for students with difficulties

Adaptive applications provide targeted support for students with different learning styles or difficulties in mastering the curriculum (Rose & Meyer, 2002). This includes visual explanations, audio narrations, or additional exercises tailored to individual pacing. Such an approach reduces anxiety and increases a sense of security, as the student does not feel pressured to keep up with the entire group.

2.4. Stress reduction

Automated and timely feedback is often perceived as fairer and more objective (Brookhart, 2017). When students receive clear and constructive feedback without unnecessary delays, fear of evaluation decreases, and readiness for further learning increases. For example, a digital platform can immediately indicate correct answers and provide brief explanations for incorrect ones, turning stress into an opportunity for learning.

3. Potential negative emotional effects

3.1. Dependence and reduced autonomy

Excessive use of AI can gradually reduce independent thinking and critical reasoning (Carr, 2010). Students may develop what is called emotional dependence on technology, where feelings of security and success are linked exclusively to digital support (Turkle, 2011). For instance, a student who constantly relies on automatically generated answers may lose motivation to seek their own solutions and strategies.

3.2. Social isolation

High levels of interaction with machines rather than with people can reduce the sense of belonging and social empathy (Putnam, 2000). This is particularly true when AI is used as the primary teaching assistant rather than as a supplementary tool. Reduced authentic interpersonal contact can affect students' ability to develop emotional intelligence and teamwork skills (Goleman, 1995).

3.3. Stress from surveillance

Progress tracking systems, analysis of facial expressions, voice tone, or eye movements can create a sense of constant monitoring (Zuboff, 2019). This "digital panopticon" is often associated with increased anxiety and reduced spontaneity in students (Lyon, 2018). For example, a student aware that every action is recorded and analyzed may become overly cautious and refrain from creative or unconventional responses.

3.4. Potential bias and unfairness

Algorithmic biases can lead to inaccurate or discriminatory evaluations, which may cause a sense of injustice (O'Neil, 2016). Biases may arise from incomplete or inappropriate data used to train AI (Noble, 2018). For example, an automated essay grading system may unconsciously favor a particular writing style or linguistic constructions that are not equally represented across all cultural and linguistic contexts.

4. Teacher perspective

The teacher plays a key role in mediating between the student and technology. Positive integration of AI involves using technology as a support tool, not a replacement for human interaction. Teachers should:

1. Encourage critical thinking about AI-provided information.
2. Recognize emotional reactions and intervene with students experiencing fear or insecurity.
3. Ensure a balance between digital and interpersonal communication.

5. Example of a lesson with AI

Subject: Macedonian language
Topic: Analysis of a poem
Goal: Develop analytical thinking and a critical approach to automated analysis.
Duration: 40 minutes

1. Introduction (5 min)
Objective: Students understand the concept of AI and its role as a support tool for poetry analysis.
Activities:

- Teacher explains AI briefly: "Artificial intelligence is technology that can analyze texts, identify rhyme, rhythm, and symbolism, but it does not replace our creativity and thinking."
- Explain lesson goal: Students read the poem, analyze it themselves, then compare their analysis with AI results.

Materials: Printed or digital poem, whiteboard/projector for AI demonstration
Emotional Aspect: Joy and curiosity in discovering new technology

2. Main Part (25 min)
Objective: Develop analytical and critical skills, compare human and AI analysis.
Activities:

1. Reading the poem (5 min) – individually, then aloud in groups
2. Note-taking (5 min) – record observations on rhythm, rhyme, symbolism, emotional impact
3. Using AI tool (10 min) – input poem; AI analyzes rhythm, rhyme, symbolism
4. Comparison (5 min) – students compare their notes with AI results; teacher prompts discussion: "Where do our conclusions match AI's?", "Where are there differences and why?", "How do you feel when AI gives different results than yours?"

Materials: Laptops/tablets with AI application, notebooks, interactive screen
Emotional Aspect: Joy and curiosity for new interpretations; mild anxiety if "AI knows better"; increased confidence when results align

3. Conclusion (10 min)
Objective: Reflect on emotional responses and analytical learning.
Activities:

- Circle discussion (5 min) – share impressions and feelings using AI
- Written reflection (5 min) – "What did I learn about poem analysis today?", "How did I feel when AI gave different results?"

Materials: Reflection sheets, pens
Emotional Aspect: Recognize personal progress, accept different interpretations; foster security and self-confidence

Teacher roles: Mentor, moderator, observer of emotional reactions

Expected outcomes:

- Students develop analytical and critical skills
- Understand differences between human and machine analysis
- Promote emotional intelligence and confidence in using new technologies

6. Psychological, pedagogical, and ethical Implications

AI is a significant resource in modern education, but it cannot replace the empathy, intuition, and human warmth that teachers bring to learning (Fullan & Langworthy, 2014). Education is not just information transfer but also emotional support, motivation, and interpersonal relationship building (Hattie, 2009). Students learn more effectively when they feel the teacher is engaged, interested, and caring (Wentzel, 2010).

From a psychological perspective, maintaining live teacher-student communication is crucial for trust, empathy, and social skills development (Goleman, 2006). AI can enrich teaching with adaptive

content and interactive activities, but it should function as a support tool, not a dominant factor (Selwyn, 2019). Overreliance on technology may risk pedagogical alienation and reduced social interaction.

Ethically, issues arise around data privacy, equal access, and algorithmic transparency (Floridi & Cowls, 2019). Data privacy requires clear rules about what information is collected, how it is stored, and who can access it (Zuboff, 2019). Equal access prevents digital inequality between students with and without technological resources (Warschauer, 2004). Algorithmic transparency ensures that teachers, parents, and students understand how systems make decisions and which data are used (O'Neil, 2016).

Ethical and pedagogically sustainable AI integration requires a combination of technological innovation and human responsibility, including ongoing teacher training, regulations to protect privacy, and promotion of digital ethics (UNESCO, 2021).

Recommendations

- **Integrate AI as support, not a replacement for the teacher:** Use AI to enrich teaching, while the teacher remains key for transmitting values, empathy, and critical thinking. AI can provide adaptive tests and automated feedback, with the teacher as mentor and discussion moderator (Selwyn, 2019).
- **Encourage collaboration and teamwork:** Technology should support, not reduce, interpersonal interaction. Group projects using AI as a resource (e.g., data collection or visual materials) develop communication, social empathy, and collective responsibility (Slavin, 2014; Johnson & Johnson, 2009).
- **Develop digital literacy and emotional intelligence:** Students need skills for critical analysis of digital content, recognizing bias, and responsible technology use (Hobbs, 2010), along with activities fostering emotional intelligence – understanding and regulating one's emotions and recognizing others' (Goleman, 1995).
- **Teacher training to monitor and guide students' emotional reactions:** Teachers should recognize signs of anxiety, frustration, or technology dependence (CASEL, 2020) and use AI to promote positive school climate (OECD, 2021).

7. Conclusion

AI has the potential to enrich education and increase student motivation, but it can also provoke anxiety, isolation, or dependence. The key lies in balanced implementation, where teachers use AI to foster creativity, critical thinking, and emotional stability in students.

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