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ЦИФРОВА КОМУНІКАЦІЯ ТА ЕМОЦІЙНИЙ ІНТЕЛЕКТ: КОГНІТИВНІ ТА АФЕКТИВНІ ПРОЦЕСИ У ВІРТУАЛЬНОМУ НАВЧАННІ

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DIGITAL COMMUNICATION AND EMOTIONAL INTELLIGENCE: COGNITIVE AND AFFECTIVE PROCESSES IN VIRTUAL LEARNING

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Анотація. Розширення віртуальних навчальних середовищ суттєво змінило когнітивні, афективні та соціальні аспекти освіти, підкреслюючи важливість емоційного інтелекту для успішного навчання. У цій статті розглядається комплексна взаємодія когнітивних, афективних та соціальних процесів, що становлять емоційний інтелект у цифровому навчанні. Спираючись на фундаментальні теоретичні моделі, зокрема модель здібностей Майєра та Саловея, змішану модель Гоулмана, модель емоційно-соціальних компетенцій Бар-Она, соціально-когнітивну теорію Бандури, процесуальну модель регуляції емоцій Гросса та теорію соціальної присутності, стаття синтезує сучасні емпіричні дослідження щодо самоефективності, саморегуляції, регуляції емоцій та соціальної присутності в онлайн-навчанні. Дослідження підтверджують, що емоційні стани учнів динамічно змінюються залежно від складності навчального контенту, взаємодії, зворотного зв'язку та соціальної динаміки, а ефективні стратегії регуляції емоцій у поєднанні з високим рівнем соціально-емоційних компетенцій сприяють мотивації, залученню, наполегливості та формуванню підтримуючих навчальних спільнот. У статті також підкреслюється важливість розвитку саморегульованого навчання, створення автентичної соціальної присутності та моніторингу емоційних траєкторій учнів за допомогою рефлексивних практик та технологічних інструментів. Інтегруючи когнітивні та афективні перспективи, дослідження пропонує комплексну модель, що підкреслює центральну роль емоційного інтелекту у подоланні викликів віртуальної освіти. Результати дослідження надають практичні рекомендації для педагогів і розробників навчальних програм щодо підвищення благополуччя учнів, їх залученості та академічних досягнень, демонструючи, що емоційний інтелект є не допоміжною навичкою, а ключовим компонентом ефективної цифрової педагогіки.

Ключові слова: емоційний інтелект, віртуальне навчання, саморегульоване навчання, регуляція емоцій, соціальна присутність, когнітивно-афективні процеси.

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Abstract. The expansion of virtual learning environments has fundamentally reshaped the cognitive, affective and social dimensions of education, making emotional intelligence an essential factor for learner success. This article examines the intricate interplay of cognitive, affective and social processes that constitute emotional intelligence in digitally mediated learning contexts. Drawing on seminal theoretical frameworks – including Mayer and Salovey's ability-based model, Goleman's mixed model, Bar-On's emotional-social competency model, Bandura's social-cognitive theory, Gross's process model of emotion regulation and Social Presence Theory – the study synthesizes contemporary empirical research on self-efficacy, self-regulation, emotion regulation and social presence in online learning. Evidence demonstrates that learners' emotional states fluctuate dynamically in response to content complexity, interaction, feedback and social dynamics, and that adaptive emotion regulation strategies, combined with strong social-emotional competencies, support engagement, motivation, persistence and community building. The article further emphasizes the importance of fostering self-regulated learning, promoting authentic social presence and monitoring learners' emotional trajectories through reflective practices and technological tools such as sentiment analysis and affective computing. By integrating cognitive and affective perspectives, the study presents a comprehensive framework that highlights the centrality of emotional intelligence for navigating the challenges of virtual education. The findings provide practical guidance for educators and instructional designers seeking to enhance learner wellbeing, engagement and academic

achievement, demonstrating that emotional intelligence is not a peripheral skill but a core component of effective digital pedagogy.

Keywords: *emotional intelligence, virtual learning, self-regulated learning, emotion regulation, social presence, cognitive-affective processes.*

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Introduction. In the rapidly expanding domain of virtual education, digital communication tools increasingly mediate human interaction, transforming the nature of learning spaces. While the asynchronous and synchronous features of online platforms offer flexibility, they also pose profound emotional and cognitive challenges for learners. Emotional intelligence – defined as the capacity to perceive, understand, regulate, and use emotions adaptively – becomes a critical psychological resource in these contexts. The intersection of digital communication and emotional intelligence is best understood through psychological frameworks that consider both cognitive and affective processes.

Literature Review. Recent studies have increasingly explored the intersection of digital communication and emotional intelligence in virtual learning environments. For example, Pekrun, Goetz, Titz & Perry (2002) highlighted the critical role of students' emotions in learning, showing that affective states directly influence motivation and academic performance. Research by D'Mello and Graesser (2015) further emphasizes the importance of understanding learners' emotional dynamics in computer-mediated environments, illustrating how affective states fluctuate during interactive learning activities and influence outcomes. Additionally, Schunk and DiBenedetto (2020), drawing on social-cognitive theory, emphasize that learners' motivational and self-regulatory processes – including cognitive monitoring and emotional self-management – are central to sustaining engagement and achievement, which is especially relevant in virtual learning environments.

However, despite these contributions, existing research often remains fragmented. Many studies focus on isolated components of emotional intelligence – such as emotion regulation, empathy, or self-efficacy – without

providing an integrated framework that accounts for both cognitive and affective processes within digitally mediated learning contexts. Additionally, few publications explicitly examine how emotional intelligence interacts with the unique challenges of digital communication, including reduced nonverbal cues, asynchronous interactions, and varying levels of social presence. Therefore, a more holistic and theoretically grounded exploration is required to address these limitations. This gap underscores the urgency of the present article: a comprehensive analysis is needed to synthesize current knowledge, highlight unresolved issues, and provide a cohesive framework for understanding emotional intelligence in virtual learning environments.

Thus, the primary **aim of this article** is to examine the cognitive and affective processes underlying emotional intelligence in digitally mediated learning environments. In doing so, the article positions emotional intelligence as a central component of successful digital pedagogy. By addressing these objectives, the article contributes to a more nuanced understanding of emotional intelligence in the digital age and offers practical guidance for educators and instructional designers seeking to optimize virtual learning experiences.

Results. John D. Mayer and Peter Salovey's pioneering conceptualization frames emotional intelligence as an ability composed of four branches: perceiving emotions, facilitating thought via emotion, understanding emotions, and managing emotions (Salovey & Mayer, 1990). Their later work with David Caruso (2004) led to the Mayer – Salovey – Caruso Emotional Intelligence Test (MSCEIT), which operationalizes these branches through performance-based tasks. Mayer and Salovey also introduced the concept of meta-mood – individuals' reflective awareness of their own mood states – which allows learners to monitor and adapt their

emotional experiences. These constructs illustrate how emotional perception and understanding contribute to cognitive processing in virtual environments.

In turn, Daniel Goleman (1995) popularized emotional intelligence in the public sphere by articulating a mixed model composed of five key domains: self-awareness, self-regulation, social awareness (empathy), motivation and social skills. In virtual learning, where nonverbal cues are less obvious and communication can feel impersonal, the social-emotional competencies in Goleman's model become vital for sustaining engagement and fostering a supportive online community. Thus, Goleman's framework complements ability-based models by highlighting the interpersonal demands of digital learning contexts.

Reuven Bar-On (2006) contributed a model of emotional intelligence that emphasizes emotional and social competencies such as stress tolerance, interpersonal skills, and self-expression. Bar-On's perspective, therefore, reinforces the importance of adaptive emotional functioning in managing the unique pressures of online learning.

Albert Bandura's (1977) social-cognitive theory underscores self-efficacy as a central belief in one's capacity to execute behaviours necessary for desired outcomes. In virtual learning, self-efficacy strongly influences how learners set goals, choose strategies, and persist in challenging tasks. Self-regulated learning is particularly relevant here: learners in digital environments must independently monitor, control, and regulate their cognition, motivation, and behaviour. Moreover, research has shown that resilience predicts greater self-regulated learning efficacy, which in turn predicts more effective emotion regulation strategies and greater emotional engagement in online learning environments (Schunk & DiBenedetto, 2020). This relationship demonstrates the deep interconnection between emotional and cognitive dimensions of learning in digital contexts.

James J. Gross's (2002) process model of emotion regulation offers a useful lens for

understanding how learners manage their emotional experiences. His model distinguishes between antecedent-focused strategies (e.g., cognitive reappraisal) and response-focused strategies (e.g., expressive suppression). Empirical research in online learning settings supports Gross's model: for instance it suggests that cognitive reappraisal generally promotes emotional and academic engagement, whereas expressive suppression is associated with less adaptive emotional outcomes (Zhoc, Cai, Yeung & Shan, 2022). Broader studies of students' emotions and engagement in digital or hybrid environments similarly highlight the importance of constructive emotion regulation for maintaining wellbeing and participation (Ge, 2025). Such findings underscore the centrality of affective processes in shaping learners' digital experiences.

In digital communication, another critical dimension is social presence – the sense that others are “there” in the virtual space. Social presence theory, as formulated by Short, Williams and Christie (1976), posits that technology-mediated communication often lacks the richness of face-to-face interaction, reducing the perception of others as real and psychologically present. Reduced social presence can exacerbate feelings of isolation, but high emotional intelligence (especially empathy and social skills, according to Goleman) may help learners to compensate by actively building community, interpreting limited non-verbal cues, and regulating the emotional climate of online group interactions. Recent empirical work confirms a positive correlation between learners' emotional intelligence and engagement in fully online learning communities (D'Mello & Graesser, 2015). Therefore, emotional intelligence not only influences individual learning strategies but also contributes to the creation of supportive digital communities.

Beyond static regulation, emotional states in virtual discussion forums can be dynamic. Garcia, Kappas, Küster and Schweitzer (2016) modelled how valence (positive – negative emotion) and arousal

(activation) fluctuate as users participate in online discussions. Their results showed that arousal tends to increase when reading emotionally charged content, and that, after expressing oneself, individuals often experience a regulation mechanism: arousal decreases, indicating a “relaxation” toward a baseline. This aligns with Gross’s notion that regulation can occur after emotional activation and also highlights the real-time, collective nature of emotion in digital communication. These insights reveal that learners’ emotional trajectories are continually shaped by both individual regulation strategies and the social dynamics of online platforms.

Putting the pieces together, a psychologically rich account of emotional intelligence in virtual learning should emphasize the interplay among:

1. Self-efficacy and self-regulation (Cognitive). Bandura’s social-cognitive theory explains how learners’ beliefs in their own capabilities shape their willingness and ability to self-regulate (Bandura, 1997; 2001). Research on self-regulated learning in online environments, such as that by Schunk & DiBenedetto (2020) and Panadero (2017), demonstrates how goal-setting, strategic planning, and self-monitoring adapt to the unique affordances and challenges of digital learning platforms.

2. Emotion regulation (Affective). Gross’s (2002) process model of emotion regulation is particularly relevant for understanding learners’ emotional engagement in online settings. Studies show that learners with higher emotional intelligence tend to manage their emotional experiences more effectively, supporting motivation, persistence, and engagement in virtual learning environments. Thus, effective emotion regulation complements self-efficacy and self-regulation, ensuring that learners can navigate both the cognitive and emotional demands of online learning.

3. Social presence and community building. Social Presence Theory, originally developed by Short, Williams, & Christie (1976), provides a framework for understanding how emotional connection and

interpersonal warmth can be reduced in mediated communication. However, emotionally intelligent learners can compensate for reduced nonverbal cues by applying empathy, perspective taking, responsiveness and relational awareness. In other words, the ability to regulate one’s own emotions and maintain self-efficacy also supports the cultivation of meaningful social interactions online.

4. Dynamics of online emotional states. Research by D’Mello & Graesser (2015) shows that learners’ emotions in digital learning environments fluctuate dynamically in response to content difficulty, feedback, interaction, and personal regulation strategies. Recognizing these dynamic emotional patterns underscores the need for pedagogical strategies that are responsive to the shifting psychological states of learners.

Understanding these cognitive-affective processes has several important implications for the design and facilitation of online learning:

Assessment and support of emotional intelligence: Instructors and instructional designers can use measures like the MSCEIT (Mayer, Salovey, Caruso) to assess students’ emotional strengths and tailor support accordingly.

Fostering self-regulated learning: Embedding scaffolds, prompts and reflection activities that strengthen self-efficacy, goal-setting, and strategic self-regulation can boost learners’ capacity to self-manage in virtual settings.

Emotion regulation training: Incorporating modules or micro-lessons on cognitive reappraisal, mindfulness, and emotional awareness can help learners better navigate the emotional ups and downs of online learning.

Promoting social presence: Building opportunities for authentic social interaction, peer feedback, and emotionally rich communication (e.g., video calls, empathy-based discussion norms) compensates for reduced nonverbal cues.

Monitoring emotional dynamics: Using real-time analytics, sentiment analysis, or

affective computing tools (e.g., facial expression-based emotion detection) can help educators detect emotional trends in learners and intervene proactively.

Conclusions. Digital communication in virtual learning spaces profoundly reshapes how learners think, feel, and regulate themselves. Emotional intelligence – especially when framed through integrated models such as those of Mayer & Salovey, Goleman, and Bar-On – offers a powerful psychological lens to understand these transformations. Cognitive processes like self-efficacy and self-regulation (drawing on Bandura and self-regulated learning theory)

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