BG Pulse Journal USA
ISSN:1947-2536 http://www.bgpulseusa.com/index.php/bg

DEVELOPING STUDENTS' EMOTIONAL SELF-REGULATION SKILLS IN A DIGITAL LEARNING ENVIRONMENT

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doi:https://doi.org/10.5281/zenodo.24098277

Abstract. The article considers the development of students' emotional self-regulation skills in the digital learning environment as a component of digital emotional intelligence based on D. Goleman's book "Emotional Intelligence", M. Csikszentmihalyi's theory of "flow" and R. Pekrun's theory of achievement emotions. The influence of notifications, multitasking, anxiety related to online assessment and anger in virtual communication on students' attention and working memory is described. As a result, a four-stage pedagogical model for developing students' emotional self-regulation in the digital environment has been designed, and recommendations for its use in higher education are given.

Аннотация. В статье рассматривается развитие навыков эмоциональной саморегуляции студентов в цифровой образовательной среде как составной части цифрового эмоционального интеллекта на основе книги Д. Гоулмана «Эмоциональный интеллект», теории «потока» М. Чиксентмихайи и теории учебных эмоций Р. Пекруна. Раскрыто влияние уведомлений, многозадачности, тревоги, связанной с онлайн-оцениванием, и гнева в виртуальном общении на внимание и рабочую память студентов. В результате исследования разработана четырёхэтапная педагогическая модель развития эмоциональной саморегуляции студентов в цифровой среде и даны рекомендации по её применению в высшем образовании.

Annotatsiya. Maqolada raqamli ta’lim muhitida talabalarning emotsional o‘zini o‘zi boshqarish ko‘nikmalarini rivojlantirish masalasi raqamli emotsional intellektning tarkibiy qismi sifatida D. Goulmanning «Emotsional intellekt» asari, M. Chiksentmixayining «oqim» nazariyasi hamda R. Pekrunning akademik emotsiyalar nazariyasi asosida tahlil qilingan. Raqamli muhitdagi bildirishnomalar, ko‘p vazifalilik, onlayn baholash bilan bog‘liq xavotir va virtual muloqotdagi g‘azabning talabalar diqqati va ishchi xotirasiga ta’siri yoritilgan. Tadqiqot natijasida talabalarning raqamli muhitda emotsional o‘zini o‘zi boshqarishini rivojlantirishning to‘rt bosqichli pedagogik modeli ishlab chiqilgan hamda oliy ta’lim jarayonida qo‘llash bo‘yicha tavsiyalar berilgan.

Key words: digital emotional intelligence, emotional self-regulation, digital learning environment, student, multitasking, anxiety, flow state, pedagogical model.

Ключевые слова: цифровой эмоциональный интеллект, эмоциональная саморегуляция, цифровая образовательная среда, студент, многозадачность, тревога, состояние «потока», педагогическая модель.

Kalit so‘zlar: raqamli emotsional intellekt, emotsional o‘zini o‘zi boshqarish, raqamli ta’lim muhiti, talaba, ko‘p vazifalilik, xavotir, «oqim» holati, pedagogik model.

Introduction

The digitalization of higher education is fundamentally transforming the ways students learn, communicate, and express themselves. In the "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030", approved by Decree No. UP-5847 of the President of the Republic of Uzbekistan, the widespread introduction of digital technologies and

distance learning formats into the educational process is defined as a key task [2]. The "Digital Uzbekistan – 2030" Strategy specifies enhancing the digital literacy of the population, especially youth, as a priority direction [3]. Furthermore, the Law "On Education" reinforces distance learning as one of the legal forms of education [1].

However, the digital environment brings students not only new opportunities but also new emotional challenges: constant notifications, attempts to multitask simultaneously, anxiety associated with online testing and answering in front of a camera, as well as conflicts in social networks. D. Goleman defined the state in which strong emotions instantly overtake rational thought as an "emotional hijacking", emphasizing that an anxious, angry, or depressed person cannot process information effectively [4]. In a digital environment, such states occur frequently and imperceptibly.

Therefore, developing students' ability to recognize and manage their emotions in a digital environment—namely, the self-regulation component of digital emotional intelligence—represents an urgent scientific and pedagogical task.

The purpose of the study is to determine the pedagogical foundations for developing students' emotional self-regulation skills in a digital learning environment and to design an implementation model. Tasks of the study: to clarify the concept of digital emotional intelligence and its structure; to analyze the factors of the digital environment affecting students' emotional state; to establish corresponding pedagogical tasks; and to propose a pedagogical model for developing emotional self-regulation.

Literature Review

The concept of emotional intelligence was introduced into scientific discourse by P. Salovey and J. Mayer, who defined it as the ability to monitor and distinguish one's own and others' feelings and to use this information to guide thinking and actions [5]. Later, they developed emotional intelligence into a four-branch ability model consisting of perceiving, facilitating thought, understanding, and managing emotions [6]. In his model, D. Goleman highlighted knowing one's emotions and managing them as the first two domains of emotional intelligence, calling self-awareness the "foundation of emotional intelligence" [4]. Meanwhile, R. Bar-On emphasized stress tolerance and impulse control as distinct components of emotional intelligence [13].

The impact of emotions on cognitive performance is substantiated in neurophysiological research. J. LeDoux demonstrated that the amygdala can respond to a threat signal before the neocortex has time to analyze it [8]. A. Baddeley described working memory as a system responsible for holding information necessary for completing complex cognitive tasks [9], while M. Eysenck and co-authors proved that anxiety directs attention toward threats, thereby consuming working memory resources [10]. According to R. Pekrun's control-value theory of achievement emotions, emotions such as anxiety, boredom, and hopelessness directly influence student motivation and performance [12].

Specific features of the digital environment have also been investigated. L. Rosen and co-authors observed students during independent study and found that they were distracted by social media or messages within minutes, and that such multitasking was strongly associated with lower academic achievement [11]. According to M. Csikszentmihalyi's "flow" theory, optimal experience occurs in the zone between boredom and anxiety when attention is fully focused on the task [7]; continuous distractions prevent individuals from entering this state. Russian researcher D.V. Lyusin highlights the intrapersonal component (managing one's own emotions) of emotional intelligence separately [14]. The concept of digital emotional intelligence has been examined in domestic research by Y.T. Orinova, highlighting the conditions for its development in higher education and

the role of information technology [15; 16]. Literature analysis shows that a comprehensive pedagogical model for developing students' emotional self-regulation in a digital environment has not yet been sufficiently developed.

Research Methodology

The study utilized theoretical and methodological analysis, content analysis of D. Goleman's work and sources on digital education, comparative analysis, a systems approach, generalization, and pedagogical modeling. The methodological framework of the study is built upon P. Salovey and J. Mayer's ability model [5; 6], D. Goleman's emotional intelligence concept [4], M. Csikszentmihalyi's flow theory [7], and R. Pekrun's theory of achievement emotions [12].

Analysis and Results

According to the analysis results, digital emotional intelligence is defined as an individual's ability to recognize, understand, and manage their own and others' emotions in a digital environment, and to structure digital communication and activities effectively on this basis. Its self-regulation component corresponds to the domains of "managing emotions" and "self-motivation" in D. Goleman's model [4], but exhibits distinct manifestations in digital settings. The main emotional factors faced by students in a digital learning environment and their corresponding pedagogical tasks are summarized in Table 1.

Table 1. Digital environment factors, emotional states of students, and pedagogical tasks

Digital environment factor	Emotional state arising in student	Impact on learning performance	Pedagogical task
Constant notifications, multitasking	Restlessness, fear of missing out (FOMO)	Attention is fragmented, working memory is overloaded, performance decreases	Digital hygiene: notification management, working with "focus blocks"
Online testing, camera-on answers	Test anxiety, fear of technical glitches	Inability to demonstrate existing knowledge	Practice tasks, positive attitude toward mistakes, calming techniques
Conflicts in social networks and chats	Anger, feeling insulted	Impulsive response, "emotional hijacking", distraction from learning	"Stop and think" rule, delaying responses, naming emotions
Information overload	Fatigue, feeling overwhelmed	Motivation decreases, tasks are procrastinated	Setting priorities, breaking tasks into steps
Excessively easy or unclear online assignment	Boredom or anxiety	Interest fades or student gives up effort	Differentiated assignments, immediate feedback

	(inducing flow)

D. Goleman provides an example from his own experience: intense fear during an exam "paralyzed" his thinking, rendering him unable to write a single answer for an hour; the author views this as clear evidence of the emotional brain overriding the thinking brain [4]. The prefrontal cortex manages working memory, but when the limbic system is under stress, its efficiency drops [4; 9]. In online assessment, this anxiety is compounded by the fear of technical malfunctions; therefore, familiarizing students with practice tests in advance is of key importance.

Regarding anger, Goleman draws on D. Zillmann's research showing that a chain of provoking thoughts escalates with each subsequent "insult", and that the most effective way to interrupt it is to allow time for physiological arousal to subside while reassessing the situation [4]. In digital communication, responses are sent instantaneously, leaving no time to cool down; thus, the skill of consciously delaying responses is an essential sign of digital emotional intelligence.

On the positive side, Csikszentmihalyi's studies revealed that high-performing students experienced a state of "flow" during 40% of their study time, whereas low-performing students experienced it only 16% of the time [4; 7]. Flow occurs in the optimal zone where challenges slightly exceed current skill levels and attention is fully absorbed in the task. Digital platforms can foster flow by tailoring task difficulty and providing immediate feedback, provided students can regulate distractions.

Based on theoretical analysis and synthesis, a four-stage pedagogical model for developing students' emotional self-regulation in a digital learning environment was designed (Table 2). The target component of the model is preparing students capable of recognizing and managing their emotions in digital settings; the content component includes emotional self-awareness, self-regulation, and intrinsic motivation; the technological component encompasses digital hygiene, reflection, and differentiated tasks; the outcome component comprises criteria for digital emotional self-regulation.

Table 2. Model for developing emotional self-regulation in a digital environment

Stage	Methods and tools	Expected outcome (criterion)
1. Digital emotional self-awareness	Online mood scale, electronic "emotion journal", analyzing device usage statistics	Student identifies emotions in digital activities and their causes (Cognitive criterion)
2. Managing emotional balance	"Stop and think" rule, response delay, breathing exercises, practice sessions for online exams	Able to reduce anxiety and anger, avoids impulsive responses (Regulatory criterion)
3. Attention management and entering flow	Notification-free "focus blocks" (25–45 min), differentiated tasks, immediate feedback	Maintains sustained focus on tasks, derives satisfaction from learning (Motivational criterion)
4. Reflection and digital	Weekly digital reflection,	Evaluates and adjusts

culture	group experience sharing, co-developing digital communication rules	personal digital behavior (Personal criterion)

Discussion

The proposed model considers digital technologies not as a source of emotional problems, but as a tool for developing emotional self-regulation when managed correctly. For instance, device usage statistics enable students to observe where their attention is directed, while electronic journals and online surveys facilitate regular tracking of emotions. As D. Goleman noted, small but regularly repeated emotional lessons become ingrained habits [4]; therefore, the model should be implemented not as a one-off training, but as a continuous practice throughout the semester.

The teacher plays a pivotal role in integrating this model into higher education. Educators need to observe students' emotional states during online sessions, explicitly communicate evaluation criteria in advance, and create an atmosphere where errors are viewed as learning opportunities. Incorporating topics on digital emotional intelligence into the curricula of pedagogy, psychology, and information technology courses will support students in consciously acquiring these competencies [15; 16].

A limitation of this study is its theoretical nature; the effectiveness of the proposed model needs to be empirically verified in subsequent experimental research. For this purpose, using standardized questionnaires to assess students' emotional intelligence levels, academic anxiety, and digital device usage habits is recommended.

Conclusion and Recommendations

Based on the theoretical analysis, the following conclusions and recommendations are drawn:

1) Digital emotional intelligence is an individual's capacity to perceive, understand, and manage emotions within digital environments, with emotional self-regulation serving as one of its core structural components.

2) Persistent notifications, task-switching/multitasking, online assessment anxiety, and virtual communication conflicts constrain students' attentional capacity and working memory, ultimately impairing learning outcomes.

3) The four-stage model—comprising digital emotional self-awareness, emotional balance regulation, attention control and flow entry, and reflection—enables systematic development of these competencies in students.

4) Higher education institutions are recommended to integrate "digital hygiene" and the "stop and think" rule into academic workflows, as well as administer practice tests prior to high-stakes online assessments.

5) Designing a dedicated course or module on digital emotional intelligence for prospective pedagogy students is highly advisable.

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