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ENHANCING STUDENTS' EMOTIONAL INTELLIGENCE WITH GAME-BASED LEARNING AS AN ICT TOOL

Abstract. The purpose of this study is to examine the potential of game-based learning as an information and communication technology for educational activities, with a focus on enhancing emotional intelligence. The study aims to understand the effectiveness of game-based learning, identify key contributing factors, and provide practical insights for learning and personal development. The article covers the principles and strategies for designing game-based learning environments that are specifically tailored to promote emotional intelligence in learners, considering elements such as game design, feedback mechanisms, and interactive features. The transformation matrix of the self-assessment test of emotional intelligence to game situations is presented. Links between "EI test questions", "Mechanics" (game rules), "Dynamics" (game strategies, and time), "Game aesthetics", and "Pedagogical strategies" are shown. This article presents a quantitative analysis of the results from a controlled study that investigates the effectiveness of game-based learning in improving emotional intelligence. It could provide insights into the measurable impact of such educational activities. A paper prototype of the emoji test was presented, and multivariate testing of the level of emotional intelligence, emotional burnout, and aggression of university students and teachers before and after the game was conducted with the help of EI. Playing games based on emotional intelligence and following the recommendations led to positive changes: an increase in emotional intelligence and a decrease in emotional energy and aggression. The study results contain recommendations for teachers, instructors, or organizations interested in implementing game-based learning programs. The study can contribute to the broader field of emotional intelligence theory and learning by expanding the understanding of how computer game-based learning as interactive ICT experiences can influence the development of emotional intelligence and the quality of education.

Keywords: game-based learning; video games; emotional intelligence; emotional work; higher education; multifactorial approach; ICT in education

Statement and substantiation of the urgency of the problem. In the digital reform of the humanitarian sphere, preserving the psycho-emotional health of individuals and society as a whole is crucial. This is especially important in areas such as education, culture, lifestyle, social adaptation, and career growth. According to the World Health Organization (WHO), mental health is defined as a state of well-being where individuals are able to realize their abilities, cope with stress, be productive, and make positive contributions to their community. This includes their ability to think, express emotions, interact with others, earn a living, and enjoy life. Therefore, it is significant for the modern education system to prioritize the emotional well-being of students as an integral part of their mental health, quality of life, and future career success. One way to achieve this is through the introduction of game-based learning. However, in scientific circles, there are still fears about the negative consequences of video game addiction.

The World Health Organization has also identified the issue of increasing global aggression in 2002. According to the World Health Organization (WHO), violence is the deliberate use of physical force or power, whether threatened or actual, against oneself, others, or a group or community. Such violence can result in injury, death, psychological harm, or deprivation. This definition was established by the WHO in 1996. The WHO report on aggression looks at a wide range of types and causes of violence. In particular, the following are noted: «a lack of respect by the younger generation; tension between traditional and new family structures; restructuring of the basic support networks for the elderly; migration of young couples to new towns, leaving elderly parents in deteriorating residential areas within town centers» (Carp, 2000), (World Health Organisation, 2002). But the aggression factors are symptoms of global problems: sociocultural entropy (the collapse of the system of traditions, cultural values and norms, and spiritual guidelines), economic and environmental crises, and pandemics (Javed, Sarwer, Soto, & Mashwani, 2020), (Nabavi, 2021); (World Health Organisation, 2019), the global impact of the techno sphere on the consciousness of each individual and society. All above violates the psycho-emotional health of a person and society. Along with political, economic, social, societal, and demographic risk factors for collective violence, the WHO also noted technological factors. However, they are identified with «weapons technology» (World Health Organisation, 2002). The techno environment threats influence is not studied: digital games (Dowsett & Jackson, 2019), (Verheijen, Burk, Stoltz, van den Berg, & Cillessen, 2021), social networks (Liu, 2021), (Meshi & Ellithorpe, 2021), information lifestyle and virtualization.

The psycho-emotional management of students in their educational preparation for future professional activities, topical given the facts:

1. Online learning is a widespread development because of pandemic restrictions.
2. Significant promotion of the gaming industry. According to Statista, as of 2021, there have been almost 3.24 billion video game players worldwide in total (Clement, 2021). The WHO's #PlayApartTogether initiative called for staying home and playing online (GamesBeat, 2020).
3. Gamification is a trend in modern education.

Literature Review. In this literature review, various aspects of historiography are explored. It covers topics such as the psychology of emotions, emotional well-being, emotional work, emotional intelligence, and emotional burnout. Additionally, the review delves into the scientific tradition of game-based learning, including serious games and the development of educational game narratives.

A lot theoretical works have attempted to define the essence of Game-Based Learning (GBL), including those by Le Weber, and Ebner (2013), and Van Eck (2006) who raised the issue of synergy between pedagogy and GBL. Perrotta, Featherstone, Aston, and Houghton (2013) conducted a review of the literature on GBL, making predictions for its development. They laid the foundations for analyzing cognitive, motivational, affective, and sociocultural aspects of educational game design, and described empirical studies of GBL in Plass, Homer, and Kinzer's book, "Fundamentals of Game-Based Learning" (2015). However, Krath, Schürmann, and von Korflesch (2021) have noted the insufficiency of the review of modern theoretical understanding of the psychological mechanisms of gamification, and Tobias, Fletcher, and Wind навчання (2014) have reported a significant increase in the number of empirical data on the effectiveness of using video games for learning. Bai, Li, and Liu (2021) present a scientometric approach to understanding trends in the development of e-learning.

At the beginning of the 21st century, American psycholinguist J.P. Gee argued for the use of computer games as tools for teaching (Gee, 2003). This idea led to a greater understanding of the value of using digital video games or their principles in the learning process, which eventually gave rise to a new field of educational technology known as "Game-based Learning"

(GBL). GBL involves learning through computer games, which are designed to achieve specific learning outcomes. This concept was a breakthrough in pedagogical science, as computer games were often stereotyped as children's entertainment or a source of addiction and violence. Nowadays, video games are widely accepted as a social norm and used for maintaining a healthy lifestyle, eSports, business, psychological and social adaptation, and learning. Computer-mediated game-based learning has been recognized as an important alternative or complement to traditional classroom learning (Bouras, et al., 2005) and is becoming increasingly popular. Therefore, it is crucial to integrate the concept of GBL into the broader history of pedagogy and explore its roots in traditional pedagogical teachings about the role of play in learning. This will provide a solid foundation for the establishment of GBL as a scientific discipline within the field of pedagogical science.

We propose to use learning based on computer games as an information and communication technology method for educational activities to formation increase students' emotional intelligence. For this, we conducted a multivariate analysis of EI data to substantiate a dynamic model of emotional intelligence based on well-known flow theories:flow experience caused by video games for mindfulness and relaxation (Cruea), a complete immersion in a particular activity without fatigue (Csikszentmihalyi, 2014), motivation flow in educational games (EFM) (Song & Zhang, 2008), adaptation and evaluation condition (Moreno-Ger, Burgos, Martínez-Ortiz, Sierra, & Fernández-Manjón, 2008), creating positive psychology and a well-being sense (Chen, 2007), (Flett, Hayne, Riordan, Thompson, & Conner, 2019); (Rybak, 2013).

Emotional intelligence is also seen in the development's context of serious games: adoption of a serious game in the developing of emotional intelligence skills (Almeida, 2020), using emotional intelligence in training crisis managers (Mackinnon, Bacon, Cortellessa, & Cesta, 2013), deeper learning and emotion in serious games (Graesser, Chipman, & Leeming, 2009), honing emotional intelligence with game-based crucible experiences (Raybourn, 2011), (Raybourn, 2014).

Scientists are investigating the impact of digital games on creating emotional states of well-being (Agrawal, Duggirala, & Chanda, 2018), (Jagoda & McDonald, 2019); (Johannes, Vuorre, & Przybylski, 2021), increasing the level of mindfulness (Sliwinski, Katsikitis, & Jones, 2015). We should note that game developments and their research generally focus on the emotionally-relaxing sphere. Emotional and volitional processes and higher feelings that are formed or changed during the video game are not sufficiently studied. The game's ability to deal with aggressive reactions and burnout also remains open.

The works on intelligent tutoring and environment systems development proposed a technological approach to game learning. E.g. games become a part of smart infotainment systems equipped with emotional intelligence (Panagopoulos, et al., 2019), emotional triggers (Raybourn, 2014), affective computing models for recognizing student emotional states (Lester, Ha, Lee, Mott, Rowe, & Sabourin, 2013), etc.

It is important to emphasize the ability of game-based learning (Gee, 2003; Winn, 2009) to influence the emotional state of players, reducing the level of emotional burnout and aggression, and forming a sense of well-being, empathy, and the joy of knowledge. The research results can aid in developing educational game algorithms (Luhova, Blazhko, Troianovska, Riashchenko, 2019). As part of the author's research on game-based learning, (Luhova T. A., 2021), (Luhova & Kolot, 2023), the proposed study aims to explore this field in greater detail.

The purpose of the research is to investigate the potential of utilizing game-based learning techniques as an ICT tool for educational activities aimed at enhancing emotional intelligence in students.

The methodological basis. The study purpose led to the use of the following methods:

- literature review – to determine the novelty of the study;
- testing (questionnaire) – to determine the level of emotional intelligence, emotional burnout, and aggression of respondents before and after the game;
- multi-factor data analysis in Pivot Table – for consolidation, processing, comparing, and interpreting primary test data;
- assessing the effectiveness. The primary goal is to determine whether game-based learning interventions can effectively enhance emotional intelligence. This involves measuring changes in emotional intelligence levels before and after participating in game-based activities.
- identifying key factors. The research seeks to identify the critical factors within game-based learning approaches that contribute to the improvement of emotional intelligence. This could include game design elements, feedback mechanisms, or specific game scenarios that are particularly effective;
- infographics – to present generalized test results in histograms;
- generalization – to plan recommendations for game designers and higher humanities education teachers, and to summarize the results of the study.

Presentation of the main material with justification of the obtained results. The study involved 30 people, including 24 women and 6 men. Distribution by age groups: students - 15 people (age group 19-25); University teachers (lecturers) - 15 people: 3 people (age group 25-30), 2 people (age group 31-35), 2 people (age group 36-40), 3 people (age group 41-45), 3 people (age group 46-50), 2 people (age group 50 and older). The group of individuals was controlled and studied to identify possible features in the well-being of students.

We carried out experimental testing according to the plan:

1. Respondents were invited to play the well-known games «Geometry Dash», «Need for Speed» of their choice in any convenient way (mobile application, personal computer, etc.). Both games proposed to the respondents belong to the type of positive feedback loop, "whoever wins faster". Thus, they cause presumably strong emotional reactions to randomness and failure. So they can serve as the basis for the emotional intelligence study. Besides, the short duration of the gaming sessions of these games facilitated the procedure for experiment conducting.
2. multi-factor testing of the level of emotional intelligence, emotional burnout, and aggression of students and university teachers.
3. Repetition of the selected game with respondents, following the emotional intelligence model: pauses, emoji test (Figure 1), analysis of emotions, live communication, mini-games for attention and reflection, positive emotions as guard conditions for opening a new game level.

Fig. 1. Paper prototype of the emoji test

4. Retesting the level of emotional intelligence, aggression, and emotional burnout.
5. The following methods were used to collect and analyze multi-factorial empirical data:

– N. Hall Emotional Intelligence Self-Evaluation (Hall Emotional Intelligence Test, 2016), (Goetz, Frenzel, Pekrun, & Hall, 2005);.
– The level of emotional burnout Inventory by V.V. Boiko (Boiko, 1999).
– The Buss-Durkee Hostility Inventory (BDHI) (Bushman, Cooper, & Lemke, 1991).

The initial testing results according to N. Hall's method are summarized in Table 1 and Figures 2 and 3.

Table 1.
Average values of test results according to the N. Hall's method

Respondents	Emotional awareness	Managing one's own emotions	Self-motivation	Empathy	Manage other people's emotions
Students	11 average	-1.5 very low	7 low	10 average	8 average
Lecturers	11 average	4 low	10 average	10 average	10 average

Figures 6 and 7 show the individual values of emotional intelligence relative to the average data for students and lecturers groups. Symbols used: 1 - emotional awareness, 2 - managing one's own emotions, 3 - self-motivation, 4 - empathy, 5 - managing other people's emotions. The average values are 8-13.

The graphs in both studied groups show the distribution of the deviations from the mean values.
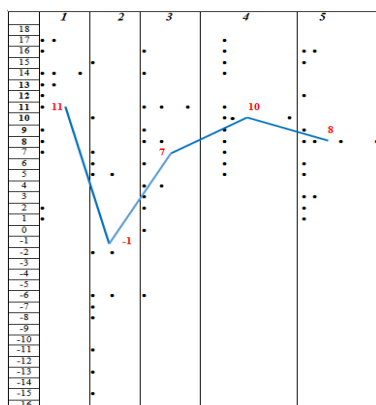

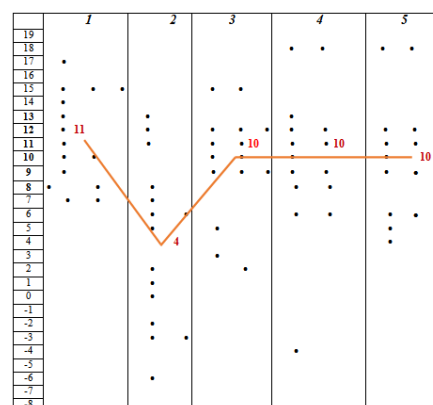Fig. 2. Individual values of emotional intelligence in a students group

Fig. 3. Individual values of emotional intelligence in a lecturers group

The analysis of the got data of the preliminary testing of the emotional intelligence of the respondents revealed:

1. The indicator «Emotional awareness», which characterizes the awareness and understanding of their own emotions and inner state and is based on expanding the vocabulary of emotions, is in groups of students and lecturers at the average level of expression.
2. Indicator «Managing one's own emotions», which describes the arbitrary

management of their own emotions: emotional flexibility, detachment, has a very low level of expression in students and low - in lecturers.

3. The indicator «Self-motivation», which defines their own behavior through emotion management, has a low level of expression in students and medium - in lecturers.
4. The indicator of «Empathy», which characterizes the ability to empathize, understand the emotions of others, is in groups of students and lecturers at the average level of expression.
5. The indicator of «Manage other people's emotions», which represents the ability to influence the emotional state of other people, is in the groups of students and lecturers at the middle level.
6. The average value of the integrative indicator of emotional intelligence is at a low level in the group of students and medium level - in the group of lecturers.
7. The existing difficulties are observed on the following averages: «Managing one's own emotions» (very low level in the student group and low - in the lecturer group), «Self-motivation» (low level in the student group), integrative emotional intelligence (low level) in a group of students.

Retesting the level of emotional intelligence in the same groups after the game on the EI model and our recommendations showed a positive trend to increase some indicators: emotional awareness, self-management, self-motivation, empathy. The indicator of managing other people's emotions has positive changes in the group of lecturers, while in the students' group, the indicator has remained unchanged.

On the histogram, we showed the partial results of the previous test - marked with the number 1, the results of the re-test - with the number 2 (Figure 4).
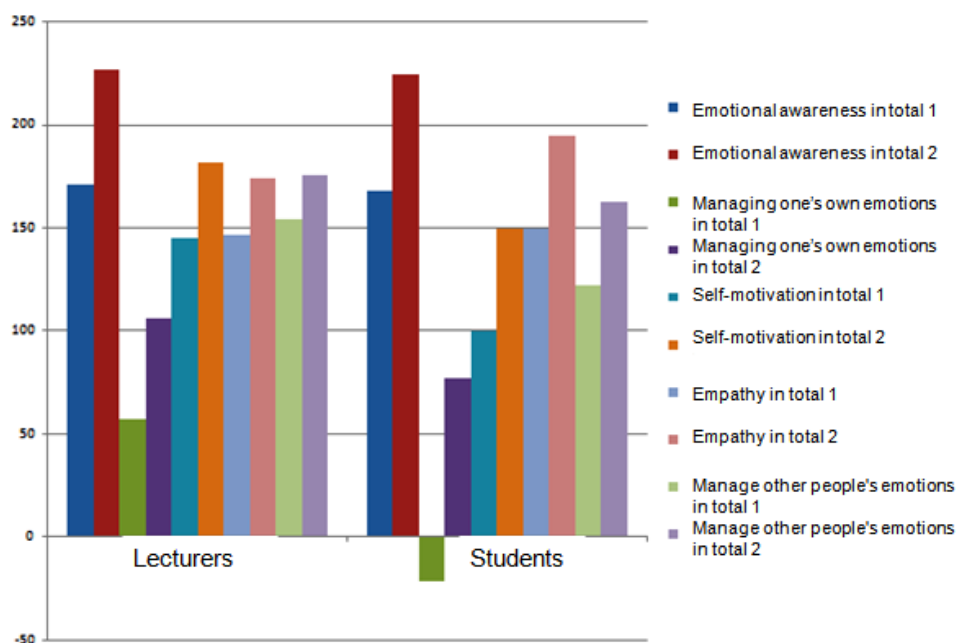

Fig. 4. EI test results before (Mark 1) and after the game (Mark 2)

Integrative results of emotional intelligence (EI), emotional burnout (EB), aggression, and hostility levels before and after the game according to the EI model are shown in Figure 5. Retesting rates show a positive correlation between increased EI and reduced emotional burnout, aggression, and hostility.
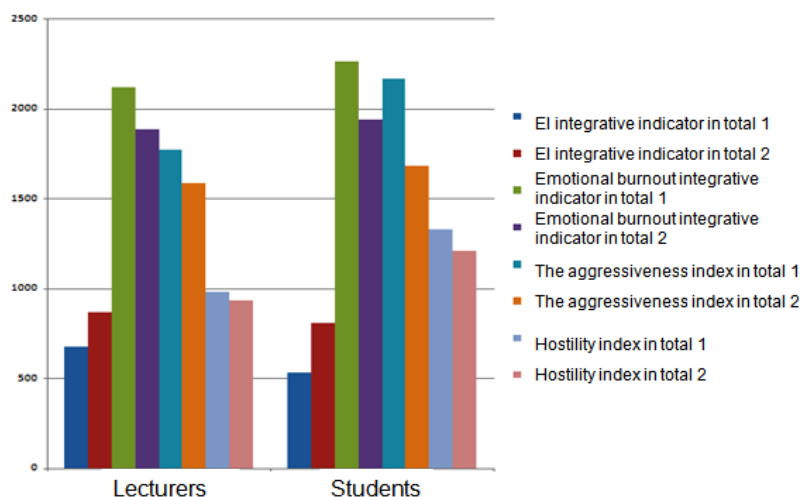
Fig. 5. Level indicators of the EI, EB, hostility and aggression before (1) and after the EI game (2)

The results of the analysis of emotional burnout preliminary indicators in groups of students and lecturers, the severity of phases and symptoms, are shown in Table 2.

Table 2.

Comparison of emotional burnout indicators in groups of students and lecturers by phases and symptoms

Emotional burnout: phases and symptoms	Number of responses showing the expression levels of phases and symptoms in groups of students (S) and lecturers (L)					
	Formation level		Formation level			
			Formation level 16-19		The level of formation – «dominance» 20 and>	
	S	L	S	L	S	L
STRESS PHASE	3	4	3	5	-	-
1. Symptom of «Psycho-traumatic circumstances experience»	7	1	-	1	4	6
2. Symptom of «Self-dissatisfaction»	5	4	-	-	1	2
3. Symptom of «Feeling deadlocked»	2	1	1	-	1	4
4. Symptom of «Anxiety and depression»	5	8	3	-	3	4
PHASE RESISTANCE	5	5	8	8	-	-
1. Symptom of «Inadequate choice of emotional response»	5	4	2	3	7	9
2. Symptom of «Emotional and moral disorientation»	5	2	4	3	2	-
3. Symptom of «Expanding the scope of saving emotions»	4	4	-	-	4	5
4. Symptom of «Reduction of professional responsibilities»	4	5	3	-	5	5
DEPLETION PHASE	7	9	4	1	-	-
1. Symptom of «Emotional deficit»	5	6	1	-	4	1
2. Symptom of «Emotional alienation»	5	6	1	2	4	1
3. Symptom of «Personal detachment»	3	2	2	-	2	3
4. Symptom of «Psychosomatic and psycho vegetative disorders»	4	4	2	-	2	2

The «Stress» phase began to form at 3 students and at 4 lecturers, already formed at 4 students and 5 lecturers. This phase characterizes the beginning of emotional burnout under the influence of traumatic factors of the situation associated with the COVID-19 pandemic, war

state in the country. Anxious tension provokes all symptoms' development of the phase: 32 responses for students and 36 responses for lecturers - the number of choices is approximately the same. Of these, at the level of formation, including dominance, 16 for students and 17 for lecturers.

At 5 students and 5 lecturers, the «Resistance» phase began. At 8 students and 8 lecturers, it already formed. This phase defines a person's desire to reduce the pressure of psycho-traumatic circumstances by limiting the emotional response when communicating. Limiting the range and intensity of emotions leads to emotional and moral disorientation, saving emotions, which also affects the quality of interpersonal relationships and provokes a reduction in personal achievement. According to the phase symptoms: at the beginning level of formation - 18 for students and 15 for lecturers; at the formed level - 27 for students and 25 for lecturers, of which at the level of dominance - 18 for students and 19 for lecturers.

A decrease in energy tone and the use of protection as burnout outlines the «Depletion» phase. A person levels his own ability to empathize and the ability to help somebody else and narrows the range of emotional responses. Against the background of emotional lack, depersonalization is intensifying, the system of values and attitudes is being dehumanized. Negative and distorted emotional reactions move to the level of psychosomatic diseases. The results of the selection according to the symptoms of the phase: at the beginning level of formation - 17 for students and 18 for lecturers; at the formed level - 18 for students and 9 for lecturers, of which at the level of dominance - 12 for students and 7 for lecturers.

Table 3 shows the indicators' correspondence of emotional intelligence and emotional burnout by analyzing their content. This allows us to conclude about the general trend of deteriorating emotional intelligence under the influence of emotional burnout in a stressful situation.

Table 3.
The emotional intelligence and emotional burnout indicators correspondence

Emotional burnout: phases and symptoms	Emotional intelligence indicators: average values of expression levels				
	Emotional awareness (S, L – average)	Manage your own emotions (S – very low L – low)	Self-motivation (S - low L – average)	Empathy (S, L – average)	Manage other people's emotions (S, L – average)
STRESS PHASE					
1. Symptom of «Psycho-traumatic circumstances experience»	X	X	X	X	X
2. Symptom of «Self-dissatisfaction»		X	X	X	
3. Symptom of «Feeling deadlocked»		X	X		X
4. Symptom of «Anxiety and depression»		X	X	X	X
PHASE RESISTANCE					
1. Symptom of «Inadequate choice of emotional response»	X	X	X	X	X
2. Symptom of «Emotional and moral disorientation»	X	X	X	X	X
3. Symptom of «Expanding the scope of saving emotions»	X	X	X	X	X
4. Symptom of «Reduction of professional responsibilities»		X	X		
DEPLETION PHASE					
1. Symptom of «Emotional deficit»	X	X	X	X	X
2. Symptom of «Emotional alienation»	X	X	X	X	X

3. Symptom of «Personal detachment»		X	X	X	X
4. Symptom of «Psychosomatic and psycho vegetative disorders»		X	X	X	X

The «Stress» provokes all the symptoms of the phase. A decrease in the range and intensity of emotions characterizes the phase of «Resistance», limiting emotional response, which leads to emotional and moral disorientation, saving emotions, reducing personal achievements. A decrease in empathy, a significant narrowing of the spectrum of emotional response, characterized the phase of «Depletion» increased depersonalization, dehumanization of the value system, the negative, distorted emotional reactions transition to the psychosomatic diseases. Changes in integrative indicators of emotional burnout before and after the EI game are shown in Figure 6.
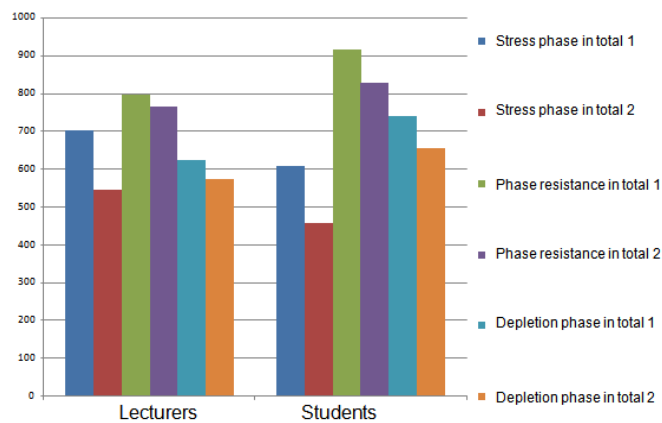

Fig. 6. Indicators of the emotional burnout level before (1) and after the EI game (2)

The analysis of the aggression and hostility scales showed a significant expression of physical and verbal aggression, distrust in the students' group, and verbal aggression in the lecturers' group. After the game with EI, there is a reduction in all indicators (Figure 7).
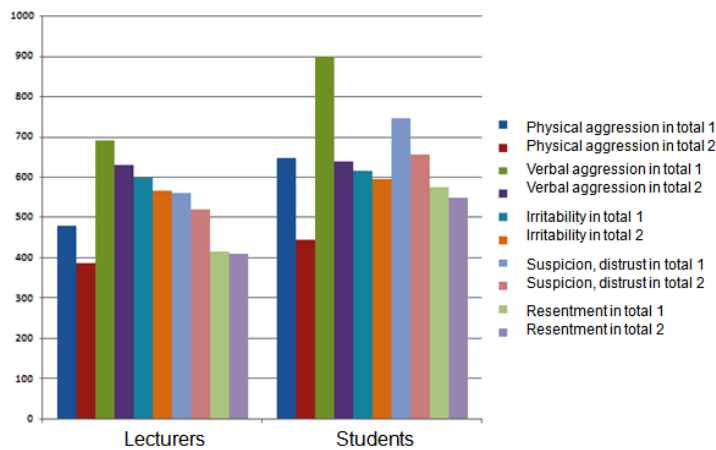

Fig. 7. The testing results of the aggression and hostility levels before (1) and after the EI game (2)

Cross-analysis of some sample indicators of empathy, emotional and moral disorientation symptoms, emotional deficit, negativism, and irritability before and after playing with EI showed a negative correlation of empathy, negativism, and irritability (Figures 8, 9).
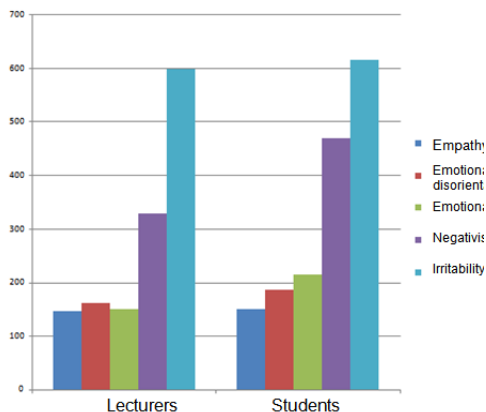
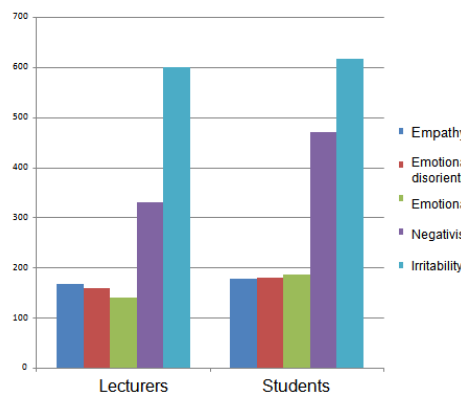Fig. 8. Test results on a sample of indicators before the game

Fig. 9. Test results on a sample of indicators after the EI game

The experience of playing with the respondents showed positive changes: increasing the level of empathy and reducing emotional disorientation, emotional deficit, negativism, and irritability (Figure 10).
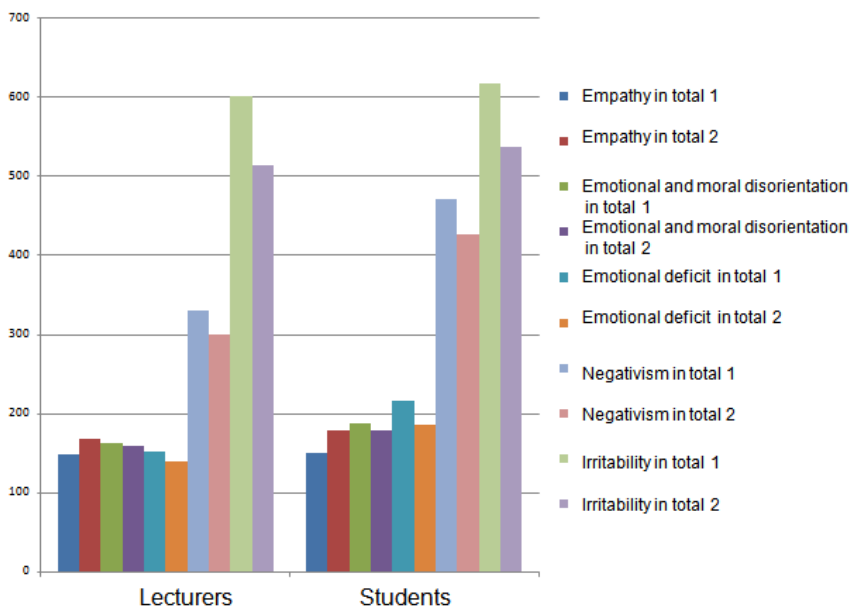

Fig. 10. Test results on a sample of indicators before (1) and after the EI game (2)

Discussion. All known emotional intelligence tests are based on self-assessment. It is very subjective. In a game situation, impersonal test questions turn into a behavioral test and a player's self-assessment through emoji-test. Then we will get objective data. The accepted interpretation of N. Hall test questions is known (Hall Emotional Intelligence Test, 2016). However, for game design, we divided self-assessment impersonal questions into five information blocks and viewed them via the MDA model (Hunicke, LeBlanc, & Zubec, 2004):

1. Emotional awareness:
   – negative emotions as resources reflect questions: «For me, both negative and positive emotions serve as a source of knowledge about how to act in life», «Negative emotions help me understand what I need to change in my life», «When time permits, I address my negative feelings and figure out what the problem is» (Hall Emotional Intelligence Test, 2016);

– self-awareness: «I can observe my feelings change», «Knowing my true feelings is important for maintaining to keep fit», «People who are aware of their true feelings manage their lives better» (Hall Emotional Intelligence Test, 2016).

2. Emotional-volitional sphere:

– ability to emotion self-control: «I'm calm when pressure from the side», «I watch how I feel», «After something upsets me, I can easily cope with my feelings», «I do not focus on negative emotions», «I can calm down quickly after an unexpected annoyance» (Hall Emotional Intelligence Test, 2016);

– self-motivation: «When necessary, I can be calm and focused to act on the demands of life», «When necessary, I can evoke a wide range of positive emotions such as fun, joy, inner uplift and humor», «I can force myself to face obstacles again and again», «I can easily enter a state of calm, preparedness, and focus», «I can easily let go of negative feelings when I need to act» (Hall Emotional Intelligence Test, 2016).

In the game design, the emotional-volitional sphere development is related to a self-regulation game experience creation. I.e., «the relationships between user interaction with features related to goal-setting, self-tracking as well as prompts, and gameful experiences: accomplishment, challenge, competition, guidance, immersion, playfulness, and sociability» (Hassan, Xi, Gurkan, Koivisto, & Hamari, 2020);

3. Empathy: «I can listen to other people's problems», «I am sensitive to the emotional needs of others», «I have a good understanding of other people's emotions, even if they are not expressed openly», «I can recognize emotions well from facial expressions», «I am good at picking up signs in communication that show what others need» (Hall Emotional Intelligence Test, 2016).

4. Managing the emotions of other people, teamwork: «I can act calming on other people», «I can improve the mood of other people», «I can be consulted on issues of relations between people», «I adequately respond to moods, impulses, and desires of other people», «People consider me a good connoisseur of other people's experiences», «I help others use their motivations to achieve personal goals» (Hall Emotional Intelligence Test, 2016).

5. Creativity: «I try to approach life problems creatively» we separately singled out, although in the traditional interpretation of this question belongs to the group of self-motivation.

The result of the impersonal questions into a game transformation should show the connection between emotions and decisions (Table 3) and have a specific output under pedagogical strategies, e.g. depper learning (Blazhko, Gdowska, Gawel, Dziabenko, & Luhova, 2017).

Table 4.
Transformation matrix of the emotional intelligence self-assessment test to the game situations

EI test	Mechanics game rules	Dynamics game strategies, time	Game aesthetics	Pedagogical strategies
Nnegative emotions as resources	Play rules: «Random», «Manage», «Move». Game Resource Management: losing in the game stages opens up new opportunities or access to new resources	Negative feedback loop. Hidden artifacts, levels, sectors.	Challenge. Discovery. Negative emotions map as game resources	Learning from Failure
Self-awareness. Emotional awareness	Game rules: «Match». Self-management. Self-tracking.	Pauses between game sessions, mindfulness games, relaxation games, distraction games, live communication tasks.	Narrative. Sensation. Map of the player's emotions and	Critical thinking and problem solving

				decisions	
Emotional and volitional sphere. Emotion self-control. Self-motivation	Game rules: «Avoid». Play rules: «Manage». Time management: the player's ability to manage time. Level management: the player's ability to manage their game history (return, repeat, improve). Self-tracking.	Direct feedback loop. The time pressure, team tasks, acceleration, and complication of tasks and game levels. Points of preservation of game history and «rebirth» of the player. Speed games. Strategies.	Challenge		Individual learning trajectory. Adaptive pedagogy. Self-directed learning
Empathy	Game rules: «Match». Play rules: «Write». Emoji tests: different players have game points if they do the same emoji choice.	Team strategies. Multiplayer. Game chats. Priority maps.	Fellowship		Effective communication
Managing the emotions of other people, teamwork	Play rules: «Shoot». The term «shoot» is not considered in the literal sense but invites the player to touch an object at a distance, or somehow affect it. Winning subject to team cooperation.				Cooperative/ collaboration learning. Academic mindset
Creativity	Game rules: «Create». Winning conditions - creative knowledge application.	Game's emphasis on creation, creativity.	Fantasy. Expression		Content mastery

Recommendations. To develop the student's emotional intelligence for educational purposes, we planned the recommendations when conducting the game:

1. Apply a negative feedback loop to develop emotional awareness, the ability to work with negative emotions as resources that open up new gaming and cognitive opportunities.
2. Use visualization for self-tracking (maps, resource tapes), emoji tests to determine a player's emotional state, pauses between game sessions for live communication, or relaxing mini-games to increase emotional self-awareness in the student player's growing negative emotions.
3. To enhance a player's emotional and volitional abilities, it is important to incorporate both positive and negative feedback loops in the game. This can be achieved by increasing the difficulty level as time progresses and tasks become more complex. Additionally, allowing players to replay the game and analyze their past actions and decisions can help improve their self-motivation in critical situations.
4. Put team strategies, priority maps (for the game, player, and team), and emoji tests in place.
5. Involve team mechanisms: game success team cooperation.
6. Pay considerable attention to the creative motives and narratives of the game.

Conclusion. In the study, participants played popular games like "Geometry Dash" and "Need for Speed" to test the effects of competitive gameplay on emotions. These games were chosen because they often create strong emotional responses to failure and randomness, and their short sessions made them ideal for the experiment. The study successfully combined game design principles and modern teaching methods to promote emotional awareness and self-reflection. Visualization tools like maps and resource trackers, as well as emoji tests, helped measure emotional states. Live communication during breaks and relaxing mini-games were

encouraged to balance positive and negative feedback. Team strategies and priority maps were also introduced to promote cooperation among players. The study emphasizes the importance of creativity and teamwork in gaming success and offers valuable insights into emotional intelligence development through interactive experiences.

Recommendations are created for conducting any game under the dynamic model of EI, or for the educational games design.

Multivariate analysis of the levels of emotional intelligence, emotional burnout, and aggression of a respondent's groups showed these indicators in negative correlation: lower levels of emotional intelligence lead to higher levels of emotional burnout and aggression. After the game under the EI model and following our recommendations, the indicators get positive changes to increase the level of EI and reduce emotional burnout and aggression.

Prospects for further research. The study may compare different types of games, learning environments, or instructional methods to ascertain which approaches are most beneficial for enhancing emotional intelligence.

Understanding if the improvements in emotional intelligence gained through game-based learning are sustainable over time is another objective. Researchers may investigate whether these skills persist and continue to develop beyond the immediate learning context. The research may also examine whether certain individuals or groups benefit more from game-based interventions, considering factors like age, gender, prior emotional intelligence levels, or learning preferences.

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ПІДВИЩЕННЯ ЕМОЦІЙНОГО ІНТЕЛЕКТУ ЗДОБУВАЧІВ ВИЩОЇ ОСВІТИ ЗА ДОПОМОГОЮ ІГРОВОГО НАВЧАННЯ ЯК ІНСТРУМЕНТУ ІКТ

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Анотація. Метою цього дослідження є вивчення потенціалу ігрового навчання як інформаційно-комунікаційної технології для освітньої діяльності з акцентом на підвищення емоційного інтелекту. Дослідження спрямоване на те, щоб зрозуміти ефективність навчання, заснованого на іграх, визначити ключові фактори, що сприяють цьому, і надати практичну інформацію для навчання та особистого розвитку. У статті розглядаються принципи та стратегії розробки ігрових навчальних середовищ, які спеціально створені для розвитку емоційного інтелекту в учнів, враховуючи такі елементи, як ігровий дизайн, механізми зворотного зв'язку та інтерактивні функції. Представлено матрицю трансформації тесту самооцінки емоційного інтелекту до ігрових ситуацій. Показано зв'язки між «Питаннями тесту EI», «Механікою» (правила гри), «Динамікою» (стратегії гри та ігровий час), «Естетикою гри» та «Педагогічними стратегіями». Представлено кількісний аналіз результатів контрольованого дослідження, яке вивчає ефективність ігрового навчання для покращення емоційного інтелекту. Це може дати розуміння вимірного впливу такої освітньої діяльності. Було представлено паперовий прототип емоджі-тесту та проведено багатофакторне тестування рівня емоційного інтелекту, емоційного вигорання та агресивності студентів і викладачів університету до та після гри за допомогою EI. Ігри, засновані на емоційному інтелекті, і дотримання рекомендацій призвели до позитивних змін: підвищення емоційного інтелекту та зниження емоційної енергії та агресії. Результати дослідження містять рекомендації для вчителів, інструкторів або організацій, зацікавлених у впровадженні ігрових навчальних програм. Дослідження може зробити внесок у ширшу сферу теорії емоційного інтелекту та навчання, розширивши розуміння того, як навчання за допомогою комп'ютерних ігор як інтерактивний досвід ІКТ може вплинути на розвиток емоційного інтелекту та якість освіти.

Ключові слова: ігрове навчання; відеоігри; емоційний інтелект; емоційна робота; вища освіта; багатофакторний підхід; ІКТ в освіті