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Studying the Influence of Gamification Tools on the Development of Emotional Intelligence as a Professionally Significant Property of the Teacher's Personality

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Abstract
The development of emotional intelligence of a teacher is both a direction to improve the teacher training system, and a condition for the social adaptation of young professionals, and the prevention of emotional burnout syndrome, and a factor to raise the quality of education in general. Gamification tools allow creating additional conditions for the formation of both personal characteristics and professional competencies of digital school mentors. The purpose of the work is to study the possibilities of using gamification services for developing emotional intelligence as a professionally significant trait of a teacher's personality.

The methodology is based on the analysis of the potential of digital technologies with the possibilities of gamification of learning both for the development of emotional intelligence and professional qualities of a teacher. The software implementation of game mechanics is performed by the tools of the AhaSlides gaming platform. D.V. Lyusin's questionnaire is used to determine the level of emotional intelligence.

The results of the study. The possibilities of AhaSlides for the development of emotional intelligence are determined by the example of working with a QR code; with a time limit; when processing hidden results; when creating interactive presentations with surveys, a cloud of words, open questions.

The conclusion describes factors influencing the effectiveness of using gamification tools for the development of emotional intelligence of a teacher: temperament properties, features of

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information processing, range of interests, information and digital literacy, experience of participation in gaming events.

Keywords: digital technology, personality property, game mechanics, information interaction, emotionally comfortable environment, AhaSlides.

1. Introduction

Self-knowledge, self-regulation, motivation, empathy, social skills are, according to D. Goleman's theory, the key components of emotional intelligence (Goleman, 1995). It is emotional intelligence, according to the conclusions of UNESCO experts, that is necessary for a personal competence, which is to be developed in order to achieve success and self-accomplishment (UNESCO's action in education–2030, 2023).

At the World Economic Forum 2020, analysts named emotional intelligence in the list of the 20 most in–demand skills of the digital society, helping people to interact effectively both in business structures and in cultural and educational institutions (World-Economic-Forum-Annual-Meeting-2020, 2023).

Emotional intelligence, that is, the ability to manage one's feelings and recognize others' ones, to understand people's motivation and intentions, is important to develop when training teachers of the digital school of the future.

The National Union of Teachers of Russia is actively working to coordinate efforts and improve the quality of collaboration of school managers, teachers, university tutors and students of pedagogical specialties in the following areas: support for individualization and socialization; formation of digital competencies; involvement in the life of society with the help of media technologies, assistance in interpersonal communication, network interaction (National Union of Educators, 2023).

The road map to introduce the national system of teacher development implies that the state will create conditions for the continuous professional development of teaching staff. The latter, according to M.V. Pogodaev, Yu.V. Chepurko, is impossible without the mentors' manifestation of the qualities that form the basis of their emotional intelligence (empathy, tolerance, sociability, openness) (Pogodaeva, Chepurko, 2022).

In addition, according to the requirements of the professional standard specialists in the field of education are to be able to motivate schoolchildren, organize various forms of social partnership in their activities, apply innovative (including gaming) technologies, analyze information resources and develop their own information and methodological projects.

The business game, according to S. V. Savkina, is a form of modeling those systems of relations that exist and can be effectively used in the didactic process (Savkina, 2018). R. Pishghadam and S. Sahebjam justify that in any labour collective it is necessary to build emotional and intellectual culture in a special way, to apply appropriate techniques for the formation of emotional intelligence (Pishghadam, Sahebjam, 2012).

Gamification, according to the conclusions of K. Verbakh is the universal tool that can be and should be used in solving commercial, pedagogical (including educational) tasks (Werbach, Hunter, 2015). As D.B. Pierce convincingly proves, gamified activity in the information and communication environment can have a certain potential for (Pierce, 2016):

- forming skills for the cognition of the surrounding world and oneself;
- controlling the behavior of virtual characters, collaborators, and oneself;
- managing interactions both in a computer game and in the real world.

In other words, there are additional opportunities for the formation of emotional intelligence of both the teacher and students. Implementing these opportunities in practice is complicated by the fact that many gaming services and platforms stopped operating in the country in 2022, e.g.: Microsoft games can no longer be purchased in Russian "digital" stores; Minecraft has been removed from the App Store and Google Play; the familiar and convenient Canva and Kahoot! have become unavailable for teachers.

The hypothesis of the study is that including gaming applications in the training of students of pedagogical specialties will provide additional resources for the formation of skills and abilities that form the basis of individual emotional intelligence.

2. Relevance
2.1. Literature review
2.1.1. Analysis of Russian scientific and pedagogical literature

A.V. Aleshina, S.T. Shabanov indicate that «... in order to adapt to the demands of society, a person must be able to recognize his/pher own and others' emotions, manage them» (Aleshina, Shabanov, 2012). E.P. Ilyin concludes that «... emotions play a special role in the motivational structure of a child. Emerging emotions determine the direction of activity and the ways a person performs certain actions. Based on the understanding of our emotions and the emotions of other people, each of us receives information about the events happening around» (Ilyin, 2009).

A distinctive feature of D.V. Lyusin's psychological and pedagogical model is the division of emotional intelligence into two types: intrapersonal and interpersonal intelligence (Lyusin, 2006).

E.N. Volkova believes that studies of intelligence, personality traits and pedagogical abilities, communicative skills, problems of developing professional self-awareness and self-concept of the teacher have determined both the basis for the standards of higher pedagogical education, professional activity of a teacher, and procedures for certification and evaluation of teachers' activities (Volkova, 2022). According to the conclusions of E. N. Volkova, it is important for a mentor of a modern school to be able not only to listen to the opinions of the students, but also to be able to empathize, understand and accept them. Emotional intelligence not only can, but also should be considered as a predictor of the professionalism of a modern teacher, for whom developing schoolchildren's personality is the main goal and the main result of education.

O.V. Temnyatkina, D.V. Tokmeninova note the importance of forming school teachers' communication skills, cooperation, teamwork, openness towards others (Temnyatkina, Tokmeninova, 2018). According to scientists, teachers cooperate with people, emotional intelligence becomes a professionally significant quality of the personality for them. In the developmental evaluation system the effectiveness of teachers is judged not by how well they meet one or more general standards, but, first of all, by how emotionally stable they can be in a situation of emotional instability and situational denial. It concerns the ability of a mentor to be in contact with a child who is in intensely charged emotional states (fear, anger, resentment, shame, guilt). Here, the importance of the teacher's ability to self-expression is demonstrated.

As noted by E.V. Soboleva, M.S. Perevozchikova, the use of game elements and mechanics in information interaction contributes to (Perevozchikova et al., 2023):
- involving, motivating participants in the didactic process;
- improving the quality of information transmission;
- team building and building effective communications;
- adapting specialists who are just starting their way in the profession and are not well enough in control of their own emotions (confidence, reactions to unforeseen situations).

N.I. Isupova, D.S. Nesterova, T.N. Suvorova also come to the conclusion that with the help of gamification tools, it is possible to improve a person's cognitive abilities (the speed and accuracy of processing information obtained during communication; using it as a basis for thinking and decision-making) (Isupova i dr., 2019). Conducting lessons using game mechanics based on computer technology can change the attitude of schoolchildren to the subject, interest them and even captivate them, thereby increasing their level of activity, contributing to the growth of cognitive interest, the development of critical thinking and skills for solving complex problems.

In addition, gamification of labor activity contributes to (Skurikhina, Pivovarov, 2023):
- employee adaptations;
- coordination of personal goals and goals of the organization;
- prompt information about changes in labor standards, tasks and responsibilities;
- acquiring skills for a new job (e.g.: in the form of a game simulator);
- intensification of feedback.

The implementation of game mechanics in a computer format, according to the conclusions of N.I. Isupova et al., enhances the didactic potential of gamification to improve the quality of training of future teachers (Isupova i dr., 2022).

However, the use of training programs on gaming platforms in training highly qualified specialists, as shown by M.S. Perevozchikova et al., is accompanied by a number of difficulties, e.g.: skepticism about the didactic possibilities of computer games, limited time to study/apply new technologies, the termination of some cloud services (Perevozchikova et al., 2023).

Thus, the following facts were revealed during the analysis:
- the emotional intelligence of a teacher is an important universal personality skill (for example, Volkova, 2022);
- with the help of gamification tools, it is possible to improve a person's cognitive abilities (Isupova i dr., 2019);
- game mechanics based on computer technology have the potential for the development of emotional intelligence of a teacher (Perevozchikova et al., 2023).

However, Russian scientific and pedagogical works devoted to identifying the possibilities of gamification tools on the development of emotional intelligence as a professionally significant property of the teacher's personality are clearly not enough.

2.1.2. Analysis of foreign studies

P. Salovey, D. Mayer define «emotional intelligence» as «a person's ability to track one's own and others' feelings and emotions, distinguish them and use this information in thinking and actions" (Salovey, Mayer, 1990).

J. Pierce emphasizes that emotional self–regulation, the ability to adjust to new formats, ideas, information are factors that determine the professionalism of an employee (Pierce, 2016).

K. Nwosu et al. note that reading other people's emotions, forming the mood of the collaborating participants is carried out as well in the information and communication environment (Nwosu et al., 2022).

R. Pishghadam and S. Sahebjam substantiate that it is the personal traits of a teacher that are the predictors of emotional burnout and personal achievements, e.g.: neuroticism and extraversion predict emotional exhaustion of a teacher, friendliness predicts depersonalization, and responsibility predicts personal achievements (Pishghadam, Sahebjam, 2012).

A. Ruiz-Ariza et al. analyze the influence of the work of Spanish teenagers with Pokémon GO tools on the development of their cognitive abilities (memory, attention, concentration, mathematical and linguistic thinking) and emotional intelligence (well-being, self-control, emotionality and sociability) (Ruiz-Ariza et al., 2017). Scientists note that the Pokémon GO game resources allowed to activate the learners' cognition, increase motivation, and introduce a competitive factor into "routine" computational calculations. In augmented reality, players interacted with each other, built relationships and joined a network collaboration. The authors conclude that it was the gamified augmented environment that contributed to the increased number and quality of completed tasks, the effectiveness of intellectual activity, and network communication in the context of the game. However, according to the conclusions of scientists, further research is needed to compare singleplayer and multiplayer (multi-user) applications in terms of forming previously mentioned abilities and personality qualities.

W. Toh, D. Kirschner investigate the role of video games in the social and emotional development of personality (Toh, Kirschner, 2022). The authors note that interaction in the virtual space of a video game contributes to the development of self-control and self-management skills, formation of socially significant personal qualities (insistence, responsibility, cognitive interest and activity, sociability). Summarizing the data obtained in the experimental work, the scientists conclude that users who have played video games demonstrate «faster and more accurate distribution of attention, better orientation in visual space and intellectual flexibility».

A.P. Bautista et al. conducted the study which describes the possibilities of computer-based educational gaming platforms for the moral education of young people, in particular, to resolve ethical and moral dilemmas faced by users in modern society (Bautista et al., 2022).

N.J. Thomas, R. Baral note that the competent inclusion of computer game elements in didactic interaction can prepare a person not only to solve ethical problems, but also to teach how to cope with stress and maintain mental balance (Thomas, Baral, 2023).

L. Kim, V. Jörg, R. Klasse substantiate that emotional intelligence should be considered a professionally significant property of a modern teacher (Kim et al., 2019). The development of emotional intelligence of a teacher is a condition for the social adaptation of young professionals, and the prevention of emotional burnout syndrome.

A. Cebollero-Salinas, J. Cano-Escoriaza, S. Hernández explore the possibilities of cloud services to form socio-emotional competencies (communication styles, ways to overcome stress and difficulties, emotional intelligence, etc.) (Cebollero-Salinas et al., 2022). The authors conclude that the active use of the Internet significantly affects the formation of interpersonal

communication skills, relationship management, self-control and self-knowledge. Including controlled network gaming interaction in the educational process, in their opinion, will provide additional conditions for the formation and improvement of cybersecurity culture among representatives of the digital generation.

T. Modi, Dr. S. Gochhait study the patterns of game development in work activities (Modi, Gochhait, 2023). The authors note that game mechanics are increasingly used by both employers and employees in the organization to increase motivation, get additional positive emotions, and effective business communication.

However, the presented scientific works, for all their significance, do not take into account the specifics of the Russian Education.

Thus, the analysis of the scientific works listed above makes it possible to identify the problem associated with the need for additional research on the use of gamification services for the development of emotional intelligence as a professionally significant quality of a teacher's personality.

2.2. Purpose and objectives of the study

The purpose of the work is determined by the need to study possibilities of using gamification services to identify their impact on the development of emotional intelligence as a professionally significant property of the teacher's personality.

Objectives of the study:

- to clarify the structure and features of formation of a person's emotional intelligence in the digital school;

- to describe the options for using gamification services that support implementation of the teacher's work functions and contribute to the development of emotional intelligence;

- to identify the factors affecting the quality of using gamification tools for the formation of abilities that build the basis of the individual emotional intelligence;

- to test experimentally the effectiveness of including digital gamification services in the professional training of teachers for the development of their emotional intelligence.

3. Materials and methods
3.1. Theoretical and empirical methods

When clarifying the structure and features of forming personal emotional intelligence in a digital educational environment, a theoretical analysis and generalization of scientific and methodological literature of Russian and foreign researchers on the problem was carried out.

Emotional intelligence in the presented study is considered by the authors as a set of abilities to understand one's own and others' emotions and manage them in order to solve pedagogical problems.

The analytical method is also used when choosing a gamification tool. Digital services, their functionality and didactic potential were considered in terms of emotional intelligence development (AhaSlides, Kahoot!, Employee Test, Google Classroom and others). AhaSlides is a means of gamification of the didactic approach. Its advantages: distribution conditions; availability of a Russian-language interface and developer support; a wide range of supported game elements; technical, methodological requirements for equipment and user level.

50 students of the Vyatka State University (Institute of Mathematics and Information Systems) were involved in the development of materials by means of gamification. The practical implementation and use of the application was carried out in the classrooms in the schools of the city of Kirov (Lyceum No. 21, secondary schools No. 11 and No. 26).

When choosing a methodology for assessing the abilities that form the basis of the emotional intelligence of the teacher, the following tools were analyzed: the WLEIS test for the emotional intelligence model of J. Mayer, P. Saloway and D. Caruso, N. Hall's test, D. V. Lyusin's «EmIn» questionnaire. It is the latter that was used to process the results of the experiment. «EmIn» is a questionnaire containing 46 statements. The EmIn questionnaire gives scores on subscales measuring various aspects of interpersonal and intrapersonal emotional intelligence.

The choice is justified by the fact that this technique is valid and opens the way to a reliable determination of the general integral indicator, interpersonal and intrapersonal emotional intelligence of the teacher.

Statistical data processing was performed using Pearson's $\chi 2$ (chi-square) test.

3.2. The base of research

The main purpose of the experiment was to test the potential of gamification services for the development of abilities that form the basis of the emotional intelligence of the teacher.

The experimental search work was carried out on the basis of the Vyatka State University (Institute of Mathematics and Information Systems). There were involved 50 bachelors in the field of training 44.03.05 Pedagogical education with two profiles (Physics and computer science).

All respondents are fourth– and fifth-year students. The average age of students is 21 years (54 % are female, 46 % are male). The study of digital services with opportunities for gamification and the features of their use for developing emotional intelligence took place within the disciplines "Theory and methodology of teaching computer science", "Methods of extracurricular activities in computer science". Game applications are used by students during the period of pedagogical practice in schools in Kirov: Lyceum No. 21, secondary schools No. 11 and No. 26.

Possible external variables for the experiment: material and technical base, motivation and mood of the pupils, parental consent, experience and qualification of the teacher, duration and time of classes.

To take into account the external variables of the organization during the experiment, the following features were taken to eliminate their influence on the experiment:

- the consent of all schoolchildren, their parents and legal representatives to participate in the experiment was obtained;

- a program of classes was drawn up, their frequency and time did not change;

- strict control of conditions and fixation was carried out for the entire process of working with tools AhaSlides;

-it was monitored that in other educational institutions attended by schoolchildren during the experiment there was no systematic work affecting the monitored indicators;

- the same mentors participated in the experiment;

- studies were held in the same classrooms. The tool of gamification has not changed.

3.3. Stages of research

The first stage analyzed literature and best practices in the use of digital technologies with the possibilities for gamification of learning. Various approaches to determining the components of emotional intelligence, methods of its formation have been studied.

Digital services, including gaming applications that are used or have the appropriate potential to activate information interaction were analyzed and compared: GimKit Live, Quizizz, ClassMarker, AhaSlides, Kahoot!, Poll Everywhere, Swing, BookWidgets, Aurasm, Quizlet, Photomath, Google Classroom.

Comparison criteria: distribution conditions, availability of a Russian-language interface and methodological recommendations, the range of implemented game mechanics, requirements for the level of technical level of the user and the level of equipment in the organization, support for cloud technologies, data security and proper level of security, compliance with the activities and labor functions of the teacher, tools for the development of emotional intelligence.

In 2020, the authors chose the Kahoot service! Its options maximally corresponded requirements of easy use, configuration, administration, efficiency of interaction and gamification of learning. However, since March 18, 2022 Kahoot! suspended its work in Russia. From 2022 to the present day, the AhaSlides service is used in training teachers.

Further, 50 students of the Vyatka State University (Institute of Mathematics and Information Systems) in the field of training 44.03.05 Pedagogical education with two profiles (Physics and Computer Science) were tested according to the questionnaire "EmIn".

In order for the survey results to be representative of the study, the size of the population is equal to the number of all pupils of studios.

To assess the reliability of EmIn, its developers calculated indicators of internal consistency across all scales and subscales. And the scientific community recognized these indicators as satisfactory for the use of the questionnaire in practice.

Based on the data obtained, according to the methodology of D.V. Lyusin, conclusions were drawn about the levels of the general integral indicator of emotional intelligence and its components – interpersonal and intrapersonal emotional intelligence of the teacher. Based on the materials of the questionnaire, control (25 students) and experimental (25 students) groups were formed.

The second stage of the study included systematization of theoretical material and accumulation of empirical experience in the aspect of the problem. The content of the disciplines "Theory and methodology of teaching computer science", "Methods of extracurricular activities in computer science" was enriched with blocks/modules that involve the study of digital services with opportunities for gamification and the development of emotional intelligence. Practical implementation of services and applications for gamification of information interaction was completed by students during their pedagogical practice.

The third stage of the study formulated conclusions about the potential of using gaming applications to form the abilities building the basis of emotional intelligence. The factors that provide in maximum emotionally comfortable gamified environment were identified.

4. Results
4.1. Key concepts for the formation of an emotionally comfortable gamified environment

When analyzing the literature, it was determined that structural components of the emotional intelligence of the teacher include: emotional awareness, managing one's emotions, self-motivation, empathy. The discovery of the phenomenon «emotional intelligence» is the result of the development of ideas about the nature of cognitive and affective processes, their interrelation.

Emotional intelligence is the ability of a person to comprehend the surrounding reality and the inner world through emotional components. Another conclusion, objectively follows from the analysis of the literature: emotional intelligence is an integral part of professionally important qualities of a teacher. Its development can help the teacher to become more effective and successful in work.

The use of game elements in the collaboration of participants in the didactic process supports the development of their own system of rules and etiquette. It is also revealed that it is necessary to include in training students of pedagogical specialties activities with new software tools, specifically game applications that support teacher's work functions and contribute to the development of the emotional intelligence

Emotionally comfortable gamified environment is the direct environment of participants in information interaction with a specific aura, establishment of interpersonal relationships and contacts with interlocutors (partners), free access to electronic educational resources, the voluntary nature of gaming activities.

Creating an emotionally comfortable environment is possible through changing the algorithms of traditional didactic games and introducing digital technologies, new game mechanics.

Digital gamification services are software tools that allow to implement game mechanics. Game mechanics is a game concept that includes description of the system of rules, principles of the relationship of characters between themselves and the surrounding game world.

The mechanics determines the state of the game. The game does not just complement the interaction of participants in the didactic process, it becomes an integral part of it.

It should be noted that for a teacher, gamification of information interaction is relevant due to the fact that it allows satisfying cognitive needs, promotes social adaptation, directs creative activity, professional development and self-accomplishment.

Next, we will present a methodological approach that includes describing the stages of training future teachers, ideas and principles of using gamification services in the design of an emotionally comfortable gamified environment and the development of emotional intelligence.

4.2. Practical work on the use of gamification services for the development of emotional intelligence of the teacher

Stage I. Let's clarify that as part of studying basics of general psychology, students get an idea of what emotional intelligence is (the concept, structure, role in the lifelong learning of the teacher). As mentioned earlier, there were 25 bachelors in the experimental group, 54 % female, 46 % male.

In accordance with the methodology of D. V. Lyusin, values were calculated on the scales of interpersonal and intrapersonal emotional intelligence of the teacher. Clause 4.3.1 gives the author's version of their interpretation.

Control and experimental groups, each of 25 respondents, were formed based on the results of processing the materials of the questionnaire "EmIn".

Stage II. During the classes in the discipline "Theory and methodology of teaching Computer science", future teachers in the experimental group studied gaming platforms, digital services with gamification capabilities, and specifics of their application for designing an emotionally comfortable environment.

The logic of distributing hours according to the work program: 1 hour of lecture and 4 hours of laboratory work. 8 hours were given to independent extracurricular work. Topics in computer science, which included elements of gamification were: "General-purpose information technologies", "Stages of solving problems on a computer", "Measurement of information", etc.

As noted earlier, AhaSlides was chosen as a gamification service for the development of emotional intelligence of interaction participants. It is a gaming platform that provides tools for creating interactive presentations with surveys, word cloud, open-ended questions and other types of tasks. It is possible to demonstrate slides both on the projector screen and on a smartphone (tablet).

The logic of studying the gamification tool: the basic principles of AhaSlides functioning; methods and features of registration; AhaSlides template library; creating a new presentation; slide modes and types; creating standard slides; asynchronous mode and options for connecting participants; using Google Slides presentations in AhaSlides; sorting presentations by folders; exporting answers to Excel; additional quiz settings; advantages and disadvantages of AhaSlides.

Stage III. Mastering ideas and principles of gaming technologies, mechanisms of gaming activity took place at school in classes in the discipline "Methods of extracurricular activities in computer science".

The classes were organized as follows: 1 lecture hour and 4 hours of laboratory work. 6 hours were given to independent extracurricular work.

In the classroom, students of the experimental group analyzed the experience of schools on the use of game mechanics, digital technologies to activate cognitive interest and information interaction, e.g.: forms of extracurricular activities in the general intellectual direction with AhaSlides use include: subject weeks, library lessons, competitions, excursions, olympiads, conferences, project activities, development of projects for lessons.

Example 1. Photo quest "Book commotion". In the quest space, schoolchildren got acquainted with the characters of fantasy worlds, tried to help them, get the necessary attributes for them (an apple, a key, a map). To cope with the tasks, the participants studied theoretical facts, solved puzzles and took tests.

The conclusion made by future teachers is that participants of such a game event through the gameplay and informal communication with the heroes of books have an opportunity to get interesting and useful information about the history of books, genres and types of computer graphics.

The students also highlighted the features, rules and principles of information collaboration in implementing game mechanics of the quest: the presence of the plot, contact and contactless characters, triggers for launching game events, award options.

The teachers of the experimental group analyzed trainings, business and board games.

Example 2. The Bridge game. The participants of the two teams are to build one strong bridge using the proposed materials, but the teams work in isolation from each other. The only way to communicate is to negotiate for one minute, which can be held three times. Teachers noted: this game is about team actions, communication, technical thinking, the ability to think together with your team and to assume possible solutions (conclusions) of members of the other team. And even if the game ended with the fall of the bridge, the pedagogical effect will be positive, since the participants of the game will gain experience from a detailed final analysis.

Stage IV. Digital services for gamification of information interaction was usedt by students during their pedagogical practice in schools in Kirov: Lyceum No. 21, secondary schools No. 11 and No. 26.

The AhaSlides platform was used for:
- collecting opinions, ideas, responses from the audience in real time;
- increasing the activity of participants in information interaction;
- conducting quizzes with identifying the winner;
- brainstorming;
- increase the interactivity and engagement level of an already created presentation by importing from Google Slides.

For example, AhaSlides was used for conducting a quiz («Reward» mechanics). Students, acting as a game teacher, using different types of slides on the AhaSlides platform and other interactive tools (QR code; Time limit; Hide results; Allow audience to submit more than once, etc.), were able to create quizzes with assessment. Next, the players competed with each other to get the highest number of points for correct answers to questions. The basic rule is at the end of the quiz, the winner's name is placed in the leaderboard.

Example 3. Game mechanics «Gradual transfer of information». In a dialog box with an image (a scientist in the field of computer science and programming, a discovery, an object or a phenomenon), using AhaSlides, the mentors of the digital school created graphic objects where the necessary descriptive part was placed. In detail, as if in a book, teachers could describe the appearance, behavior and emotions of the participants of the events/discoveries. With the help of such graphical windows, schoolchildren further formulated conclusions, predicted possible reactions in different spheres of society. The main rule is minimalism in the design of text, drawings, tables, and colors.

Example 4. The mechanics of the «Endless Game». Students of the experimental group developed slides containing images of great computer scientists, programmers, and IT developers.

Next to the image is a phrase, a description of a feeling or emotion, e.g.: Alan Turing (honesty), Steve Jobs (extreme egocentrism) and others. As many images as there are phrases. Each player addressed a slide under the N-number to another participant indicating the image. The participant could read the emotion and continue the game – address a new card to the next player, etc. The basic rule of this mechanics consists in strict observance of the order of actions of the participants.

Stage V. Discussion of factors affecting the quality of using gamification tools to form skills basic for an individual's emotional intelligence (e.g.: at the closing conference on the results of the practice).

4.3. Experimental assessment
4.3.1. The ascertaining stage of the experiment

In accordance with D. V. Lyusin's methodology, values were calculated on the scales of interpersonal and intrapersonal emotional intelligence of the teacher ("Very high", "High", "Medium", "Low", "Very low") to determine the overall integral indicator of emotional intelligence. The principle of their construction: very low values correspond to 10 % of the lowest scores, low values fall in the range from 11 % to 30 %, medium values – from 31 to 70 %, high values – from 71 to 90 %, very high values – from 91 to 100 %.

The author's version of their interpretation is presented below.

Level «Very high»:

Intrapersonal emotional intelligence of the teacher. The students' internal vocabulary contains many different types and forms of emotions. The future teachers improve strengths and fights with the weaknesses, not allowing the latter to direct actions and prevent from developing as a professional in their field. They skillfully apply various means to correct their behavior, making right decisions.

Interpersonal emotional intelligence of a teacher. The future teachers perceive feelings and emotions of others through themself. They like to observe the behavior of other people. They try to understand the characters and actions of their students. They masterfully use various means to correct the behavior of others.

Level «High»:

Intrapersonal emotional intelligence of the teacher. The students are aware of and understand their emotions. They constantly replenish their own vocabulary of emotions. They arbitrarily manage their emotions, using various means.

Interpersonal emotional intelligence of a teacher. The students are aware of and understand other people's emotions, manage them without mistakes. They know how to empathize with the current emotional state of the partner (interlocutor), they are ready to provide all possible support including through the impact on the emotional state with the help of various means.

Level «Medium»:

Intrapersonal emotional intelligence of a teacher. The students are almost always aware of and understand their emotions, in most cases successfully manage them. If necessary, they

replenish their own vocabulary of emotions. Practically without mistakes, they use means to correct their behavior.

Interpersonal emotional intelligence of a teacher. The students are almost always aware of and understand other people's emotions, and in most situations successfully manage them. They are able to empathize with the current emotional state of the partner (interlocutor), but not always ready to provide support. They know and with little difficulty use the means to influence the emotional state of the participants of the collaboration.

Level «Low»:

Intrapersonal emotional intelligence of the teacher. The students in most cases are not aware of and do not understand their emotions. They don't know how to control them, replenish the vocabulary of emotions very rarely. They often make mistakes when using tools to correct their behavior.

Interpersonal emotional intelligence of the teacher. In most cases, the students are not aware of and do not understand other people's emotions, and do not know how to manage them. They do not always «read» the state of a person by facial expressions, words, gestures. They often make mistakes when choosing and using means to influence the emotional state of the interlocutor.

Level «Very low»:

Intrapersonal emotional intelligence of the teacher. The students very rarely admit that they are wrong. They take a defensive position at the slightest criticism in their address. They do not seek to replenish the vocabulary of emotions. They see no point in using any means to correct their behavior.

Interpersonal emotional intelligence of the teacher. The students turn to other people to solve their problems. They are completely unable to support others and talk about their feelings. They do not think about the possibility of using any means to influence the emotional state of their interlocutors.

Thus, based on the values obtained during the interpretation of the materials, it was possible to collect data on 50 students of the pedagogical specialty. They formed experimental and control groups.

4.3.2. Forming stage of the experiment

Thus, the content of the educational program in the direction of training 44.03.05 Pedagogical education with two profiles (Physics and Computer Science) for the disciplines «Theory and methodology of teaching computer science», «Methods of extracurricular activities in computer science» included practical activities of future teachers in studying and applying gaming platforms, digital services with gamification options.

The participants of the experiment identified the specifics of their application for the design of an emotionally comfortable environment in the information educational space of the school.

According to the results of the experiment, in the course of reflexive activity, students expressed their wishes for the future study:

- features of the Alpha generation, e.g.: strengths of these teenagers include an active interest to new technologies, the ability to form their own idea of time, being in real and game space at the same time. Their weaknesses are clip perception of information; insufficient development of critical thinking; difficulties in data analysis, action planning and decision-making.

- options for the development of the practices studied, e.g.: a serial and series of the game. The advantage is that after a certain time, schoolchildren again and again get a game with characters and mechanics that bring them positive emotions.

Students of the control group were not involved in the study of digital tools with gamification capabilities and their subsequent use for designing an emotionally comfortable environment of information interaction, e.g.: they developed and conducted the journey «I want to become a programmer». The event was organized in the form of a game by stations. The schoolchildren remembered great programmers and their discoveries, got acquainted with the demonstration of the training program, solved crosswords and riddles with program codes, participated in algorithm tracing, were engaged in mutual verification of program codes, made assignments for the following players (for fellow students).

The norms of research ethics are also taken into account when conducting the experiment (especially considering that the experiment is conducted with the participation of minors). Mentors informed both schoolchildren and their parents about the stages of work. They answered all the

questions that arise, solved organizational difficulties. All rules of information security and sanitary-hygienic requirements were observed.

4.3.3. Control stage of the experiment
On the control stage of the experiment, repeated testing was carried out according to the questionnaire «EmIn».

Information about the level of formed interpersonal and intrapersonal emotional intelligence of teachers before and after the experiment is presented, respectively, in Table 1 and Table 2.

Table 1. Results of using gamification services for the development of interpersonal emotional intelligence of teachers

Level on the scale	Groups			
	Control group (25 students)		Experimental group (25 students)	
	Before the experiment	After the experiment	Before the experiment	After the experiment
Very high	1 (4 %)	2 (8 %)	1 (4 %)	4 (16 %)
High	4 (16 %)	4 (16 %)	3 (12 %)	13 (52 %)
Middle	15 (60 %)	15 (60 %)	16 (64 %)	6 (24 %)
Low	4 (16 %)	3 (12 %)	4 (16 %)	2 (8 %)
Very low	1 (4 %)	1 (4 %)	1 (4 %)	0 (0 %)

The following hypotheses were accepted:

H0: the level of formed interpersonal emotional intelligence in the experimental group is statistically equal to the level in the control group;

H1: the level in the experimental group is higher than the level in the control group. For $\alpha = 0.05$, χ^2_{crit} is equal to 9.488. $\chi^2_{obs.1}$ (before) и $\chi^2_{obs.2}$ (after) the experiment were calculated for each scale.

We get that $\chi2_{obs.1} < \chi2_{crit}$ (0.175 < 9.488), and $\chi2_{obs.2} > \chi2_{crit}$ (10.489 >9.488). Consequently, the shift in the level of interpersonal emotional intelligence of teachers is not accidental.

The next hypotheses:

H0: the level of formed intrapersonal emotional intelligence in the experimental group is statistically equal to the level in the control group;

H1: the level in the experimental group is higher than the level of the control group.

We calculate that $\chi^2_{obs.1} < \chi^2_{crit}$ (0.001 < 9.488), and $\chi^2_{obs.2} > \chi^2_{crit}$ (9.931 >9.488). The conclusion is that changes in the level of intrapersonal emotional intelligence of teachers are not accidental.

Table 2. The results using gamification services for the development of intrapersonal emotional intelligence of teachers

Level on the scale	Groups			
	Control group (25 students)		Experimental group (25 students)	
	Before the experiment	After the experiment	Before the experiment	After the experiment
Very high	0 (0 %)	0 (0 %)	0 (0 %)	1 (4 %)
High	3 (12 %)	4 (16 %)	2 (8 %)	12 (48 %)
Middle	14 (56 %)	14 (56 %)	14 (56 %)	11 (44 %)
Low	6 (24 %)	6 (24 %)	7 (28 %)	1 (4 %)
Very low	2 (8 %)	1 (4 %)	2 (8 %)	0 (0 %)

Table 3 presents the results of calculating the overall integral indicator of emotional intelligence.

Table 3. Influence of gamification tools on the integral indicator

Levels of overall integral indicator of emotional intelligence	Groups			
	Control group (25 students)		Control group (25 students)	
	Before the experiment	After the experiment	Before the experiment	After the experiment
Very high	0 (0 %)	1 (4 %)	0 (0 %)	0 (0 %)
High	3 (12 %)	10 (40 %)	3 (12 %)	4 (16 %)
Middle	8 (32 %)	11 (44 %)	9 (36 %)	8 (32 %)
Low	13 (52 %)	3 (12 %)	12 (48 %)	12 (48 %)
Very low	1 (4 %)	0 (0 %)	1 (4 %)	1 (4 %)

After calculations: $\chi^2_{obs.1} < \chi^2_{crit}$ (0.001 < 9.488), and $\chi^2_{obs.2} > \chi^2_{crit}$ $x2_{crit}$ (10.445 > 9.488). And here, the changes for the integral indicator are not accidental.

So, interaction in a digital educational environment with using game techniques provides additional opportunities to develop a set of abilities that form the basis of the emotional intelligence of the teacher's personality.

«Playing» in the information space becomes important both for modern schoolchildren-gamers who grew up on video and computer games, and for their future mentors.

5. Limitations
As possible limitations for the study we highlight:

1. In the used version, according to D.V. Lyusin, the EmIn questionnaire has a fairly high reliability (Lyusin, 2006). However, for further psychometric substantiation, its validity requires further studies.

2. The sample of subjects was not random, but was formed in accordance with the results of testing according to the psychodiagnostic methodology of D.V. Lyusin. The content of game applications was determined by the provisions of the professional standard of the teacher, the work program of the discipline and the specifics of the school's activities. Work with gifted children (implementation of the complex-target program «Gifted children»), research and project activities.

3. In addition, one of the authors of the presented study (E.V. Soboleva) has been a teacher of disciplines the content which included the study of gamification services for the development of emotional intelligence for the past 5 years.

6. Discussion
Performing a qualitative assessment of the test results, we will analyze separately the dynamics of interpersonal and intrapersonal emotional intelligence of teachers, their ratio and changes in groups for the level of the overall integral indicator.

1. The greatest dynamics for the scale of interpersonal emotional intelligence was recorded in the respondents of the experimental group at levels «Medium», «High» (40 %), for the intrapersonal emotional intelligence scale this is level «Low» (24 %). For the respondents of the control group, qualitative changes are also present, but not as significant.

For the scale of interpersonal emotional intelligence this is level «Very high» (4 %), for the scale of intrapersonal emotional intelligence – level «High» (4 %);

2. The highest dynamics in terms of the overall integral indicator was also determined for the respondents of the experimental group at level «Low» (40 %);

3. Interpersonal emotional intelligence in respondents of each group is developed more compared to intrapersonal. Perhaps this is due to the fact that students of pedagogical specialties are actively involved in team work, in trainings for the development of interpersonal relationships.

At the closing conference, all respondents noted that the interpersonal aspect of emotional intelligence is most effectively formed in professional activity and communication.

The interpretation of the level of intelligence formation on each scale is more informative than on the integral indicator. Therefore, the authors in the results of the study distinguish these two aspects on the levels – intrapersonal and interpersonal.

Future teachers proposed three criteria to assess the relevance of the content of the service with gamification tools:

1) presentation through stories (biographies, facts from the life of scientists, IT specialists and chronology of discoveries);

2) audience involvement in the process (game participants should be motivated to move in real space, answer questions and enter answers in the appropriate information field on the slide, win artifacts in the quest and use the tools of the game service when searching);

3) involvement. Users should understand that the proposed virtual gaming problem is quite real. Assisstance in resolving it for the characters can suggest them a way out in future life difficulties.

The presented methodological approach meets the principles of continuing education. Gaming cloud technologies support educational process even in zones of disasters and military conflicts. UNESCO studies show that this contributes to a faster recovery of society after crisis situations (UNESCO's action in education–2030, 2023).

The authors' conclusions about the potential of using gamification services in a digital school develop the ideas of W. Toh, D. Kirschner about the impact of games on the social and emotional development of the personality (Toh, Kirschner, 2022):

- formation of self-esteem, development of motivation to achieve,

- the ability to perform several work functions simultaneously, as well as the skills of cooperation and effective group work, leadership and taking responsibility.

The research materials complement the directions formulated earlier in the work of E.V. Soboleva, M.S. Perevozchikova to improve training of future teachers for the development and implementation of gaming applications (Soboleva, Perevozchikova, 2019): transferring some topics in the content of the discipline «Methods of extracurricular activities in computer science», in particular, «Methodology of project activities in computer science» (2 hours of practical work), «Gamification of extracurricular activities in computer science» (4 hours of practical work).

7. Conclusion

The presented study proves that training of teachers should include work with new digital tools, including gaming applications that support implementation of labor functions and contribute to the development of emotional intelligence.

Moreover, gamification of learning contributes to the formation of a special emotionally comfortable environment of interaction. However, the participants of the experiment also highlighted the problems of using gamification tools:

- termination of technical support for many high-quality gaming services in Russia;

- resistance to innovations on the part of the administration of educational institutions (for reasons of low levels of funding and material and technical equipment);

- time spent on adapting the content of educational and thematic events to the possibilities of the game service and age, psychological characteristics of schoolchildren.

The factors influencing the effectiveness of using gamification tools for the development of emotional intelligence are also identified: the «clipness» of thinking, properties of the temperament, the peculiarities of information processing, the range of cognitive and professional interests, information literacy, formed digital skills, upbringing and communication styles in the family, experience of participating in other gaming events.

As prospects for gamification of learning, we highlight the following:

- involvement of new users, e.g.: schoolchildren's parents at the stage of developing the plot of a game event;

- using neural networks, e.g.: adding illustrations created by modern technologies to the slides based on the content of the textbook;

- support for career guidance, e.g.: to consider the choice of a profession of the future in the space of the quest (a designer of «smart homes», an engineer of robotic systems, a techno-stylist, a mentor of startups, etc.).

The results of the study can be used:

- to improve educational programs for training students of pedagogical specialties;

- to apply gamification of the information and educational process in digital schools of the future;

- to conduct gaming events in the digital format in cultural and educational centers.

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