Gamification in developing readiness for self-fulfillment in students of higher educational institutions

Liudmyla Tsurkan[1]

Mykola Dubinka[2]

Nataliia Savchenko[3]

Lidiia Slipchyshyn[4]

Mykhailo Kalenyk[5]

[1]Graduate student of the Department of Innovative Technologies in Psychology, Pedagogy, and Social Work, Alfred Nobel University, Dnipro, Ukraine.

[2]PhD in Pedagogy, Associate Professor of the Department of Pedagogy and Special Education, Faculty of Pedagogy, Psychology and Arts, Volodymyr Vynnychenko Central Ukrainian State Pedagogical University, Kropyvnytskyi, Ukraine.

[3]Doctor of Pedagogical Sciences, Professor of the Department of Pedagogy and Special Education, Faculty of Pedagogy, Psychology and Arts, Volodymyr Vynnychenko Central Ukrainian State Pedagogical University, Kropyvnytskyi, Ukraine.:

[4]Doctor of Pedagogical Sciences, Senior Research Officer of the Department of Theory and Methods of Technological Education, Drawing and Computer Graphics, Faculty of Engineering and Pedagogy, National Pedagogical Drahomanov University, Kyiv, Ukraine.

[5]PhD in Pedagogy, Associate Professor of the Department of Mathematics, Physics and Methods of Their Teaching, Faculty of Physics and Mathematics, Sumy State Pedagogical University named after A. S. Makarenko, Sumy, Ukraine.

Gamification in developing readiness for self-fulfillment in students of higher educational institutions

Liudmyla Tsurkan[1], Mykola Dubinka[2], Nataliia Savchenko[3], Lidiia Slipchyshyn[4], Mykhailo Kalenyk[5]

[1]Graduate student of the Department of Innovative Technologies in Psychology, Pedagogy, and Social Work, Alfred Nobel University, Dnipro, Ukraine.

[2]PhD in Pedagogy, Associate Professor of the Department of Pedagogy and Special Education, Faculty of Pedagogy, Psychology and Arts, Volodymyr Vynnychenko Central Ukrainian State Pedagogical University, Kropyvnytskyi, Ukraine.

[3]Doctor of Pedagogical Sciences, Professor of the Department of Pedagogy and Special Education, Faculty of Pedagogy, Psychology and Arts, Volodymyr Vynnychenko Central Ukrainian State Pedagogical University, Kropyvnytskyi, Ukraine.:

[4]Doctor of Pedagogical Sciences, Senior Research Officer of the Department of Theory and Methods of Technological Education, Drawing and Computer Graphics, Faculty of Engineering and Pedagogy, National Pedagogical Drahomanov University, Kyiv, Ukraine.

[5]PhD in Pedagogy, Associate Professor of the Department of Mathematics, Physics and Methods of Their Teaching, Faculty of Physics and Mathematics, Sumy State Pedagogical University named after A. S. Makarenko, Sumy, Ukraine.

Email: larkal1835@gmail.com[1], m.dubinka2272@gmail.com[2], nataliy.140570@gmail.com[3], lida.22slipchyshyn12@gmail.com[4], mv.21kalenik@gmail.com[5]

ABSTRACT

The aim of the article is to study the peculiarities of the issue of gamification when developing readiness for self-fulfillment in students of higher educational institutions (HEIs) in the course of education. Methods. The research involved testing, factor analysis, and statistical data processing. The following research methods were used: the Ryff Scales of Psychological Well-Being (RPWB); the Personal Orientation Inventory (POI). Reliability of tools and methods was determined using Cronbach's α. Statistical data were processed using Spearman's correlation coefficient and Fisher's test. Results. The following results were obtained during the research. The Self-acceptance Scale has the lowest arithmetic mean, which is also within the lower manifestation limit. There are no high indicators on this scale. The largest share of the sample — 61.25% — has a medium self-acceptance level, of which 32.5% are students of the experimental group (EG), and 28.75% are students of the control group (CG). Conclusions. Based on the obtained data, it is possible to unequivocally assert the effectiveness of gamification in developing students' readiness for self-fulfillment. Prospects. It is necessary to continue the search for effective means of developing readiness for self-fulfillment in order to take into account the individual characteristics of each student.

Keywords: innovative education, educational technologies, effective methodology, higher education, psychological well-being.

INTRODUCTION
Relevance

The development of scientific innovations implies that new tools for the implementation of digital transformation in the educational sector appear every few years. It is very important to find a comprehensive application of these technologies in the educational process. Digital tools are increasingly being used not only for acquiring professional competencies by students, but also for the development of their psychological qualities. These qualities are primarily aimed at adapting students to the real work process. The gamification of the educational process is one of the "gentle" tools for student adaptation (Rojo-Ramos et al., 2022).

Gamification is the process of using game elements and game technologies in a non-game context. Recent scientific studies covered the issue of the use and application of gamification as a concept in various spheres of life in sufficient detail. Such modern technologies as gesture control, controllable displays and augmented reality enabled applying the gamification principles in even more diverse areas. However, a scenario implying

that gamification may enter the stage of stagnation is not excluded. The reason is the lack of scientific research on understanding game design and user interaction strategies (Shutenko et al., 2021).

Three components of the definition of gamification can be distinguished:

1) the game elements;
2) game technologies or game design in other words;
3) it may have a non-game context.

Game elements are a set of tools that create the experience of a game, typically including but not limited to points, levels, patches, rankings, avatars, rewards, missions (Cattaneo et al., 2022).

Game technologies are the process of arranging and structuring all the elements included in the game, and it requires the practical skills of a game designer. A non-gaming context is defined as an activity that is not a game for its own sake or just for the enjoyment. Such activity has goals beyond the game, for example, acquiring knowledge, developing readiness for self-fulfillment, building professional self-identity, etc. (Manzano-León et al., 2021).

The understanding of the theory and practice of the development of gamification in historical retrospect in terms of the application and implementation of game elements is one of the urgent issues in this respect. According to scientifically proven principles and algorithms that rely on evolutionary aspects of development, the gamification concept can be an effective alternative to traditional educational tools (Dichev & Dicheva, 2017).

The study of the game from the perspective of the culture shaping factor provides it with such characteristics as free activity, a game space, internal order, as well as the absence of material interest. The sense of gaming is not in individual, but in social life, in the course of which the individual strives for self-development and improvement, creating new cultural phenomena. In this aspect, game helps to strengthen and maintain social ties. In this regard, the technology of gamification of the educational process can be used to develop students' readiness for self-fulfillment (El-Telbany & Elragal, 2017).

The study of the problem of students' self-fulfillment in modern society is relevant for the following reasons. Self-fulfillment of the individual is considered as the embodiment of social experience learned by a person in particular forms and products of activity, which entails the development of an individual as a social subject. This helps to see the connection between personal and social development embodied in every act of self-fulfillment. There is a need to use this connection to stimulate both personal growth and social development (Garett & Young, 2019).

Modern science distinguishes several aspects of the study of self-fulfillment, which are listed below. The philosophical aspect is worth mentioning in the first place. It studies the essence, structure, place, role and meaning of self-fulfillment in the life of an individual and society. Second, the psychological aspect plays an important role in understanding self-fulfillment. It studies the process of self-fulfillment from the perspective of individual characteristics, personal qualities, temperament, abilities, etc. Finally, the pedagogical aspect should be mentioned, which determines the content of education, means, methods, techniques, conditions of learning and education, which contribute to the successful self-fulfillment of a person (Ge, 2018).

Self-fulfilment has a socially determined nature and is manifested in productive activity that is based on human needs in establishing connections, in a system of orientation, and in transcendence (creation). Positive freedom is a precondition for successful self-realization, which means the unity of a sense of belonging to the world and independence from it at the same time. The basis of positive freedom is the spontaneous activity of the whole personality. Spontaneous activity is the free activity of an individual, determined by creative abilities. The gamification of developing readiness for self-fulfillment is aimed at building such creative abilities (Kotukh, 2021).

Unaddressed issues

Despite numerous studies on both the issue of gamification of the educational process and students' self-fulfillment, there are still a number of unaddressed issues. There is still a need to develop a concept of socio-pedagogical support for students' self-fulfillment in the course of the educational process in HEIs. There are significant contradictions between the social demand for the self-fulfillment of the individual in the education process and insufficiently studied principles of social-pedagogical support focused on self-fulfillment. There is a lack of research that resolves the contradiction between the increased need for pedagogical theory in the development of methodological foundations of self-fulfillment and the lack of a concept of pedagogical activity aimed at the HEI students' self-fulfillment. Finally, the problem of using the latest technologies, such as gamification, in students' acquisition of not only hard skills, but also in building soft skills, still remains unaddressed.

Aim

The aim of the research is to study the impact of gamification of the educational process on developing readiness for self-fulfillment in HEI students.

Objectives/questions
1. Define the main elements of students' well-being and measure readiness for self-fulfillment in students who study with and without gamification tools.
2. Identify actual areas of self-fulfillment of HEI students.
3. Identifying the impact of gamification on developing readiness for self-fulfillment in HEI students.

LITERATURE REVIEW
There are a number of terms in the scientific literature that have a certain intersection with gamification but cannot be completely identified with it. In particular, this is discussed in the work of Bachtiar et al. (2018). The authors write that the scholars are trying to separate this term from the world of video games and mobile game applications. The authors insist on the social essence of gamification as a process.

According to Bai et al. (2020), the wide development of computer games and consumer interest draw attention to the gamification of various social processes. Researchers note that gamification is an effective way to increase loyalty and involve participants in socially significant processes. The goal of gamification can be to increase the productivity of social structures.

The authors of this study were interested in academic works that consider the applied aspect of gamification in various areas of professional activity. Those studies are presented by a number of authors, such as Zahedi et al. (2021). For the most part, the researchers presented a description of the motivational opportunities of gamification in terms of the use of various game elements, and even the psychological and behavioural results of non-financial incentives.

Speaking about the study of gamification in the educational sector, we note that the conceptual and terminological uncertainty of this concept reduces the possibilities of its study and practical use. The above fully applies to the research of gamification in the educational sector, which was conducted by Marouf & Brown (2021). In particular, it states the need for comprehensive use of elements of game technologies for the students to acquire applied knowledge.

Although game theory is not directly related to game development or gamification, it is based on rational decision making. The authors of the article Kysil & Shyshuk (2022) proved that the basis of human actions is often determined by the emotional component (irrationality and stereotypes), and not by specific decision-making criteria. Accordingly, if game theory is applied while making decisions taking into account the emotional component, the optimal strategy for the organization's development can be found. Self-fulfilment of each person is a part of the general self-fulfillment process of all humanity.

An important contribution to the science of self-realization was made by Synyshyna and Yakovytska (2021). The study empirically examines three basic human needs: competence, relatedness, and autonomy. Researchers argue that each of these needs appears to be essential to ensure the optimal functioning of the natural propensities for growth and integration. These needs are also necessary for productive social development and personal well-being.

Ivtzan et al. (2013) studied the determinants of self-fulfillment of an individual. The authors consider it a complete system capable of self-organization. According to the authors, self-fulfilment is aimed at the integration of all areas of human activity. It contributes to activation and harmonious resolution of such processes as, for example, self-determination, choice of living environment, etc.

Wang et al. (2022) believe that a person reveals his/her inner potentials and vital forces in the course of activity. The authors propose to consider self-fulfillment from the standpoint of three words: actualization - tension - relieve.

Cherniavska and Khokhlina (2021) understand self-fulfillment as the process of a person's realization of his/her natural predispositions, individual psychological features. This process must necessarily bring benefit to society or the team. Self- fulfilment accompanies a person's throughout life, but is not uniform, with certain "peaks" of development.

Apat and Swain (2022) define a harmonious personality as a personality in which the internal dynamic structure is optimally integrated and life activities develop optimally. According to the authors, a harmonious personality is satisfied with his/her mental health, ability to get along with others, good adaptation to different situations. But there is no reason to consider such a personality as a standard for everyone, because this structure is individual.

If we summarize different definitions and opinions, we can conclude that gamification is the use of game approaches that can be extended in computer games for non-game processes. This enables increasing the involvement of participants in completing applied tasks, using products and services, and increasing customer loyalty. Gamification is necessary to make any object or process exciting enough to attract the attention of youth and even older generations. That is why gamification today is an attractive tool of modern pedagogical technologies. In particular, gamification of developing students' readiness for self-fulfillment should become a new educational trend.

METHODS

Design

The effectiveness of this research is determined and evaluated by both quantitative and qualitative indicators. They were measured in the course of observation, then compared and analysed. This was followed by an interpretation of the obtained data. The research was conducted in several stages (Table 1).

Table 1: Stages of the research on gamification of developing HEI students' readiness for self-fulfillment

Item No.	Stage	Period	Stage description
1	Summative	April 2021	Determining the aim and objectives of the research. Formation of control and experimental groups from among students. Selection of research tools and methods.
2	Formative	September 2021 – June 2022	Implementation of pedagogical conditions of innovative education in order to develop readiness for self-fulfilment with the involvement of gamification (for the experimental group) and traditional teaching methods (for the control group). Study of the main components of self-realization using the RPWB. Study of students' self-actualization using the POI. Carrying out statistical processing of the obtained results. Drawing conclusions based on the obtained results.
3	Final	September 2022	Processing research results. Summing up.

Source: prepared by the authors

Participants

The experiment was conducted at Kyiv National Economic University named after Vadym Hetman. The experimental groups included 119 students, the control groups included 120 students aged 18 to 21. The study of students' self-fulfilment under the influence of the pedagogical conditions of the experimental educational gamification technology was conducted for one year. Students of 2nd-4th years of study of the Faculty of Marketing and Institute of Information Technologies in Economy took part in the experimental work. This sample enables conducting a reliable study of the impact of gamification on developing students' readiness for self-fulfilment.

Instruments

Data entry and processing was carried out using the software product "Microsoft Excel" and "SPSS Statistics 18.0". The reliability of the selected methods was tested using the Cronbach's alpha (Ali & Bhaskar, 2016). It characterizes the internal consistency of the test items and is calculated by the formula:

$$\frac{N}{N-1}\left(\frac{\sigma_x^2 - \sum_{i=1}^{N}\sigma_{Y_i}^2}{\sigma_x^2}\right), \quad\quad\quad (3)$$

where σ_x^2 – total test score variance;

$\sigma_{Y_i}^2$ – i element variance.

Data collection

Google Forms capabilities were used for the survey. Internet data collection capabilities were used. Respondents were asked to fill out the form, indicating their data, such as age, educational group, and name.

Analysis of data

1. The testing method implemented through the following techniques. The study involved the Ryff Scales of Psychological Well-Being, RPWB (Ryff, 1989). This questionnaire is designed to diagnose a person's actual well-being and measure the manifestation of the main components of self-fulfilment. These components include the following elements: positive relations with others, autonomy, environmental mastery, personal growth, purpose in life, self-acceptance. The stimulating material of the questionnaire consists of 84 statements. Answers are evaluated on a 6-point scale. The second method was the Personal Orientation Inventory, POI (Fogarty, 1994). The test is based on the self-actualization idea. The scales of the questionnaire describe the main areas of self-actualization, which is interpreted as a person's desire to fully reveal and realize his/her personal potential. The higher the score on the scale, the more pronounced a particular feature of the personality, which is a component of self-actualization.

2. Factor analysis is a procedure by which a large number of variables are reduced to a smaller number of independent variables called factors. Highly correlated variables are combined into one factor. The purpose of

factor analysis is to find such complex factors that explain the existing relationships between variables as fully as possible.

3. Fisher's test which is calculated by the formula:

$$F_{empirical} = ((2 * \arcsin(\sqrt{P_1}) - (2 * \arcsin(\sqrt{P_2})) * \sqrt{\frac{n_1 * n_2}{n_1 + n_2}}, \qquad (1)$$

where P_1 – the percentage of participants of the first group who have the sought-after characteristics, which are expressed in fractions of a unit; P_2 – the percentage of participants of the second group who have the sought-after characteristics; n_1 – number of observations in Sample 1; n_2 is — number of observations in Sample 2.

4. Spearman's rank correlation coefficient:

$$r_s = 1 - \frac{6(\sum d^2)^2}{n^3 - n}, \qquad (2)$$

where d – the difference between the ranks of the combined values of the features (regardless of its sign); n — the number of pairs. Correlation analysis was performed in the course of the study both for the data obtained in the control group and for the data obtained in the experimental groups.

Ethical criteria

The research is based on the academic principles of integrity and respect for the individual. The research excludes the possibility of discrediting on any grounds and is conducted for the academic purposes only. Tools and methods are selected according to the principles of reliability, verification of the obtained results and professionalism. All research participants gave their informed consent to the personal data processing and the publication of research results. Each research participant was assigned a code in order to maintain objectivity and privacy.

RESULTS

The study of the factors of students' personality harmony using the K. Riff's method revealed that there were no respondents with a high level of psychological well-being in the total sample. The lack of a high level of psychological well-being among young students can be justified by the immature personality. Figure 1 shows the distribution of the arithmetic means of the scales using the Psychological Wellbeing (PWB) Scale for the total sample in ascending order.
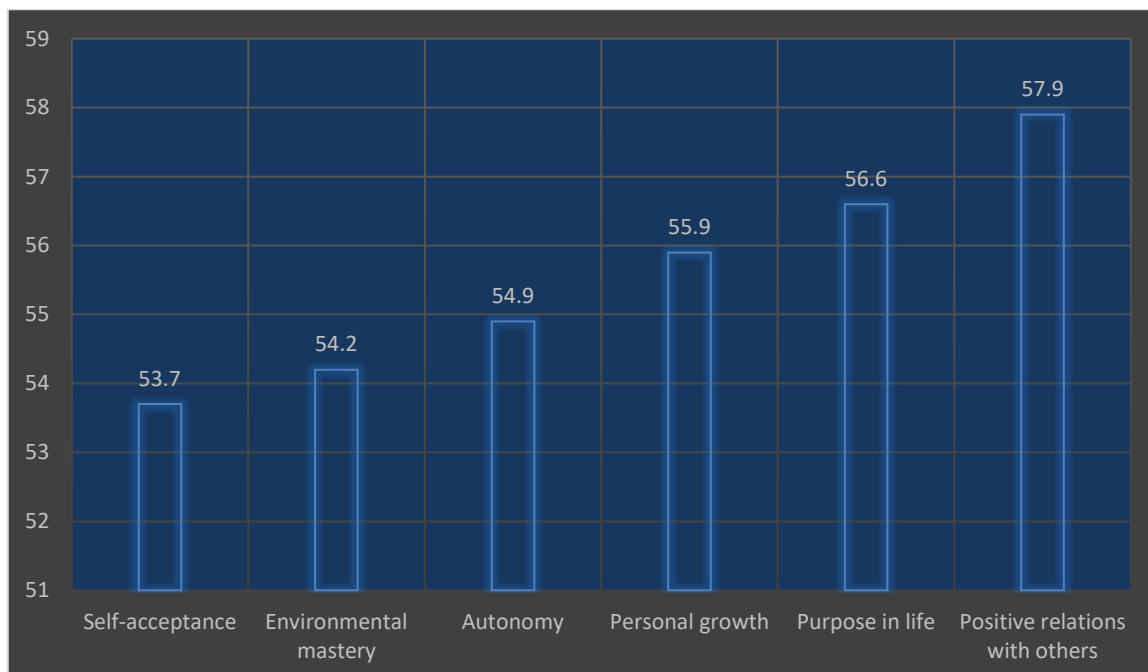

Fig. 1. Indicators of respondents for the Psychological Well-being Scales

Source: created by the authors based on the research results

The Figure above demonstrates that the Positive Relations with Others scale has the largest indicator. This is determined to the fact that students are full of hopes and expectations at a young age during the period of study. This enables them not only to think more positively, but also to accept negative challenges more smoothly. This circumstance is particularly interesting for the study of the impact of gamification on readiness for self-fulfillment because this technique is a "training environment" for working out complex behavioural reactions.

This study requires considering the structure of the Self-acceptance scale in more detail. The Self-acceptance scale has the lowest arithmetic mean, which is also within the lower manifestation limit. There are no high indicators on this scale. The largest proportion of the sample — 61.25% — has a medium level of self-acceptance, of which 32.5% are students of the experimental group, and 28.75% — of the control group. A low level of self-acceptance is characteristic of 21.25% of students in the control group and 17.5% of students in the experimental group. A low level of self-acceptance characterizes the respondents as people who are dissatisfied with themselves, disappointed by the events of their past, who are worried about some qualities of their personality, and have a desire to be different from who they are at the moment.

A correlation analysis was performed next. A correlational analysis between the Ryff Scales of Psychological Well-Being (RPWB) identified several significant correlations (Table 2).

Table 2: Correlational analysis of Ryff Scales of Psychological Well-Being

	Self-perception	Environmental mastery	Autonomy	Personal growth	Purpose in life	Self-acceptance
Self-perception	1.000	-.344**	-0.083	0.201	.221*	0.014
Environment mastery	-.344**	1.000	0.010	0.010	-0.008	0.034
Autonomy	-0.083	0.010	1.000	-.258*	0.001	0.001
Personal growth	0.201	0.010	-.258*	1.000	0.002	0.080
Life goals	.221*	-0.008	0.001	0.002	1.000	-0.009
Self-acceptance	0.014	0.034	0.001	0.080	-0.009	1.000
** The correlation is significant at 0.01						
* Correlation is significant at 0.05 (two-tailed)						

Source: calculated by the authors based on the research results

Inverse correlations are observed between Personal Growth and Autonomy scales ($p \leq 0.01$), that is, the higher the level of positive relations with others, the lower the level of autonomy. Personal Growth and Environmental Mastery ($p \leq 0.05$). This shows that the more pronounced personal growth, the less able a person is to manage the environment and control external activities. There is a direct correlation only between the Self-perception and Purpose in Life scales ($p \leq 0.05$): the more developed a person's ability to cultivate close relationships, the clearer he/she defines his guideline in life.

A separate direction in the work was the correlation analysis of the identification of the relationships between the social and personal and internal criteria, which is measured using the self-actualization test (SAT). A study of students' readiness for self-fulfillment was conducted at the experimental stage for this purpose. Rank correlation analysis of using the Spearman's rank correlation coefficient is shown in Figure 2.
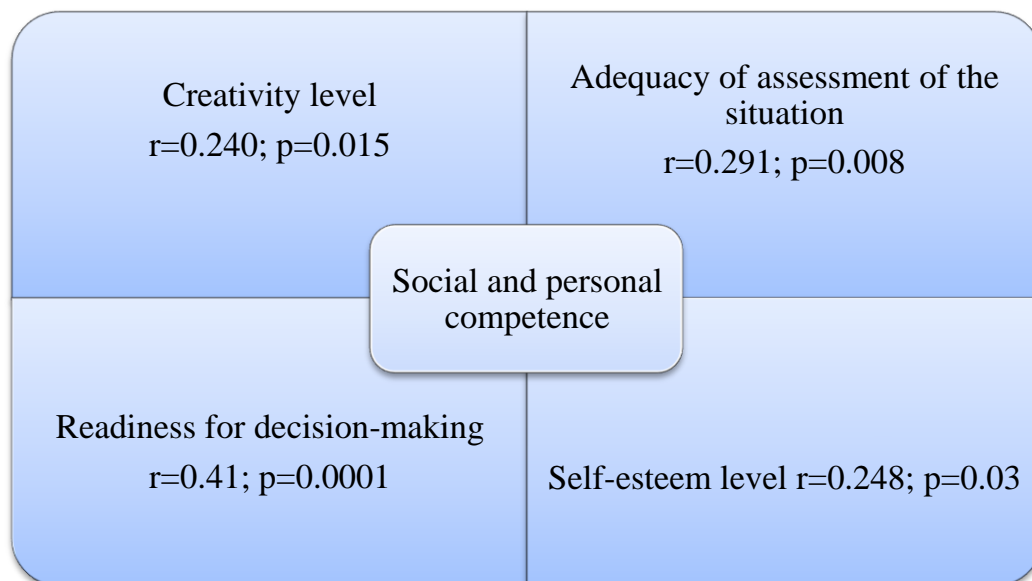

Creativity level
r=0.240; p=0.015

Adequacy of assessment of the situation
r=0.291; p=0.008

Social and personal competence

Readiness for decision-making
r=0.41; p=0.0001

Self-esteem level r=0.248; p=0.03

Fig. 2. Rank correlation analysis using Spearman's rank correlation coefficient

Source: calculated by the authors based on the research results

It can be concluded based on the obtained data that social and personal competence contributes to students' self-fulfillment (external and internal criteria). The implementation of gamification is reflected in the development of social and personal competence, which is related to an internal criterion — self-actualization and an external criterion. Data for internal and external criteria are presented below. The research found significant relationships between the adequacy of the assessment and the level of communication skills in the students of the experimental groups; self-esteem and readiness for decision-making. The obtained data show that students with a high level of communicative abilities assess the situation more adequately and vice versa: students with a low ability to adequately assess the situation have lower communicative abilities. The relationship between self-esteem and readiness for decision-making suggests that students with higher self-esteem are more willing to make independent decisions.

The social and personal competence of the students of the experimental and control groups was assessed at the summative stage of the experiment (Table 3).

Table 3: The level of social and personal competence of students at the summative stage of the research in the experimental and control groups

	LEVEL, %			
	High	Sufficient	Medium	Low
CG	0	23	40	37
EG	0	26	43	31

Source: calculated by the authors based on the research results

According to the data presented in Table 3, the ratio of research participants with different levels of social and personal competence in the experimental and control groups does not have significant differences. This testifies to the correct formation of groups and the validity of further research results. The levels of the final stage of the study are provided below (Table 4).

Table 4: The level of social and personal competence of students at the final stage of the research in the experimental and control groups

	LEVEL, %			
	High	Sufficient	Medium	Low
CG	2	22	43	21
EG	22	31	30	17

Source: calculated by the authors based on the research results

A comparison of students with different levels of social and personal competence in the experimental and control groups at the summative and final stages showed that, in general, high and sufficient levels prevail in the experimental groups, while the medium level prevails in the control group. The results of the summative stage were compared with the results of the final stage using the method of mathematical statistics — Fisher transformation — to identify changes in the studied groups (Table 5).

Table 5: The value of Fisher transformation at the final stage of the experiment

	LEVEL, %			
	High	Sufficient	Medium	Low
CG to EG	2.667**	1.788*	0.456	0.045

*- differences are reliable at $p \leq 0.05$
** - differences are reliable at $p \leq 0.01$
Source: calculated by the authors based on the research results

The research conducted at the final stage of the experiment revealed significant differences in the number of research participants with high and medium levels of social and personal competence in the experimental and control groups. After the end of the experiment, there were more participants with a medium level in the CG than in the EG, but fewer with a high level ($p \leq 0.05$). Taking into account the fact that there were no such differences at the summative stage of the research, we can say that the greater number of students with a high level of social and personal competence in EG compared to CG is the result of the implementing gamification.

DISCUSSION

As Aldemir et al. (2018) and Buckley & Doyle (2017) stated in their studies, the gamification process has long gone beyond the entertainment industry and now applies to all spheres of life, from education to career building. Unlike most other forms of translating culture, games have an important characteristic that reflects one of the key values of the network society – interactivity. This means that they imply the direct participation of the individual and invite to co-creation. At the same time, Bouchrika et al. (2019) express a rather sceptical opinion in their work regarding the assessment of the development of the digital society and the role of gamification in this process. The authors call for a more intensive integration of gamification technology into all areas of social life.

So, in the context of the relevance of gamification, it is important to arrange existing approaches to its understanding, to develop recommendations for the use of gamification in an applied aspect. Yanchuk (2021) notes the lack of such recommendations. The potential of gamification in the field of educational practice has not been fully realized. The study by Mechus and Smotr (2021) was surveyed within the scope of this article, who considered gamification as a motivation management tool in the field of education. However, the study by Pereiaslavska and Kozub (2021) indicates a comprehensive coverage of the mechanisms of introducing gamification into the educational field in the academic literature. However, it is absolutely necessary to conduct similar studies in other areas of professional activity in order to understand the specifics and features of using game mechanics.

We can state the high relevance and need for the development of well-thought-out gamified systems of non-financial incentives, as Swacha (2021) indicated. Gamification contributes to the improvement of the organization performance without significant changes in production processes, enables introducing game elements into the daily actions of employees in order to increase work motivation. Positive changes occur not as a result of changes in labour processes, but due to increased involvement of employees in the work process.

The research relies on the study of the multifaceted nature of students' self-fulfillment, which does not always enable obtaining objective information about the state of the process and the prospects for its further development. The works that examine the connection between self-fulfillment and the use of the latest pedagogical technologies are of particular significance for this research, for example Potsikaylo (2021). According to the authors, self-fulfillment is verified at a practice-oriented level, which includes the content and meaning of the concept and the pedagogical conditions for the effectiveness of socio-pedagogical support. The theoretical propositions of the study are indirectly confirmed in the work of Kotukh (2021). In particular, the author comes to the conclusion that readiness for self-fulfillment should become a multifactorial component of personality development.

The works of Cattaneo et al. (2022) and Rojo-Ramos et al. (2022) are particularly important for this research. The authors of both studies do not consider gamification as a reliable tool for developing readiness for self-fulfillment of the individual. On the contrary, both studies emphasize the need for a social educational component to achieve the goal.

The theoretical significance of the research is the proposition of applying gamification technologies to increase the level of students' readiness for self-fulfillment. The study covers all the necessary theoretical and methodological material, and a number of significant works on the topic are surveyed. The practical significance of the obtained results is that the proposed model of implementing gamification is based on the students' use of the gaming environment of computer games as a solution to an end-to-end problem. The reliability of research results is ensured by basing on achievements in the field of pedagogy and psychology, theory and teaching methods, verification of research results in the real educational process, statistical calculations.

The main limitations were caused by the imperfection of the tools because of the selection of non-parametric indicators as the subject of the research. Measurement of non-parametric indicators occurs only with the help of indirect signs. Besides, the research was complicated by the martial law introduced as a result of the full-scale aggression of the Russian Federation on the territory of Ukraine.

CONCLUSIONS

The relevance of the research is determined by the growing attention to advanced educational technologies. The study is also conditioned by the need to find and implement innovative methods of developing students' readiness for self-fulfilment in the course of the educational process in HEIs. Conclusions based on the obtained results. The obtained results of the study indisputably testify to the effectiveness of the application of gamification of the educational process in HEIs for developing students' readiness for self-fulfilment. The study proved that the readiness for self-fulfilment according to indirect indicators among the students of the experimental group is significantly higher than among the students of the control group. The pedagogical conditions for the application of gamification technologies in the educational process were created for the students of the experimental group during the study. Students of the control group studied in the standard pedagogical conditions. The conclusion is unequivocal: gamification applied in the course of higher education helps to increase students' readiness for self-fulfilment. Applications. The results of the study will be of interest

to all participants of the educational process who are interested in improving the quality of education. First of all, they can be used in the planning of methodical support of the educational process in HEIs. Prospects for further research. Future research should focus on further search for effective methods of developing HEI students' readiness for self-fulfilment. It is necessary to expand the existing toolkit for the possibility of organizing individual work with each student taking into account their individual characteristics.

REFERENCES

1. Aldemir, T., Celik, B., & Kaplan, G. (2018). A qualitative investigation of student perceptions of game elements in a gamified course. Computers in Human Behavior, 78, 235-254. https://doi.org/10.1016/j.chb.2017.10.001
2. Ali, Z., & Bhaskar, S. B. (2016). Basic statistical tools in research and data analysis. Indian Journal of Anaesthesia, 60(9), 662-669. https://doi.org/10.4103/0019-5049.190623
3. Apat, B., & Swain, P. (2022). Inept and Indifferent? Self-Understanding of Early Career Teachers of Government Schools in the Indian State of Odisha. Education Research International, 2022, 1269847. https://doi.org/10.1155/2022/1269847
4. Bachtiar, F.A., Pradana, F., Priyambadha, B., & Bastari, D.I. (2018). CoMa Development of Gamification-based E-learning. 10th International Conference on Information Technology and Electrical Engineering (ICITEE). https://doi.org/10.1109/ICITEED.2018.8534875
5. Bai, S., Hew, K. F., & Huang, B. (2020). Is gamification "bullshit"? evidence from a meta-analysis and synthesis of qualitative data in educational contexts. Educational Research Review, 30, 100322. https://doi.org/10.1016/j.edurev.2020.100322
6. Bouchrika, I., Harrati, N., Wanick, V., & Wills, G. (2019). Exploring the impact of gamification on student engagement and involvement with e-learning systems. Interactive Learning Environments, 29(8), 1244-1257. https://doi.org/10.1080/10494820.2019.1623267
7. Buckley, P., & Doyle, E. (2017). Individualising gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market. Computers & Education, 106, 43-55. https://doi.org/10.1016/j.compedu.2016.11.009
8. Cattaneo, A.A., Antonietti, C., & Rauseo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. Computers & Education, 176, 104358. https://doi.org/10.1016/j.compedu.2021.104358
9. Cherniavska, S.M., & Khokhlina, O.P. (2021). Psychological readiness for activity as a condition for professional self-realization of civil aviation pilot students. Modern aspects of science: International collective monograph, 287-306. Retrieved from https://er.nau.edu.ua/handle/NAU/54366
10. Dichev, C., & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: A critical review. International journal of educational technology in higher education, 14(9), 1-36. https://doi.org/10.1186/s41239-017-0042-5
11. El-Telbany, O., & Elragal, A. (2017). Gamification of enterprise systems: A lifecycle approach. Procedia computer science, 121, 106-114. https://doi.org/10.1016/j.procs.2017.11.015
12. Fogarty, G. (1994). Using the Personal Orientation Inventory to measure change in student self-auctualisation. Personality and Individual Differences, 17(3), 435-439. Retrieved from https://eprints.usq.edu.au/954/1/Fogarty_Using_the_Personal_Orientation_Inventory_11.pdf
13. Garett, R., & Young, S.D. (2019). Health care gamification: A study of game mechanics and elements. Tech Know Learn, 24, 341-353. https://doi.org/10.1007/s10758-018-9353-4
14. Ge, Z.-G. (2018). The impact of forfeit-or-prize gamified teaching on e-learners' learning performance. Computers & Education, 126, 143-152. https://doi.org/10.1016/j.compedu.2018.07.009
15. Ivtzan, I., Gardner, H., Bernard, I., Sekhon, M., & Hart, R. (2013). Wellbeing through Self-Fulfilment: Examining Developmental Aspects of Self-Actualisation. The Humanistic Psychologist, 41, 119-132. https://doi.org/10.1080/08873267.2012.712076
16. Kotukh, O.V. (2021). Features of Self-Realization of Students of Different Sex: Integrative Approach. Scientific Bulletin of Kherson State University. Series "Psychological Sciences", 3, 46-52. https://doi.org/10.32999/ksu2312-3206/2021-3-6
17. Kysil, T.M, & Shyshuk, M.O. (2022). Modern e-learning trends. II All-Ukrainian Scientific and Technical Conference "Modern Intellectual Information Technologies in Science and Education", 39-41. Kyiv. Retrieved from https://dut.edu.ua/uploads/n_10223_42152059.pdf#page=39

18. Manzano-León, A., Camacho-Lazarraga, P., Guerrero, M.A., Guerrero-Puerta, L., Aguilar-Parra, J.M., Trigueros, R., & Alias, A. (2021). Between level up and game over: A systematic literature review of gamification in education. Sustainability, 13(4), 2247. https://doi.org/10.3390/su13042247

19. Marouf, R., & Brown, J.A. (2021). A Review on the Contribution of ClassDojo as Point System Gamification in Education. In International Conference on Entertainment Computing, 441-448. https://doi.org/10.3390/educsci11010022

20. Mechus, Kh., & Smotr, O. (2021). Gamification in the Educational Process. Collection of abstracts of reports of the 5th All-Ukrainian scientific and practical conference of young scientists, students and cadets, 165-167. Retrieved from https://sci.ldubgd.edu.ua/bitstream/123456789/9297/1/Захист%20інформації%20%28збірник%29%20-%202021.pdf#page=165

21. Pereiaslavska, S.O., & Kozub, H.O. (2021). Gamification in the educational process. Retrieved from http://hdl.handle.net/123456789/7095

22. Potsikaylo, L. (2021). Cognitive aspect of the potential of self-realization of the individual. Collection of theses of the International Internet Conference. Ostroh. Retrieved from https://eprints.oa.edu.ua/8513/1/Зб-к%20когнітивна%20психологія.pdf#page=34

23. Rojo-Ramos, J., González-Becerra, M.J., Gómez-Paniagua, S., Adsuar, J.C. (2022). Satisfaction with Physical Activity among Students in the Last Cycle of Primary Education in Extremadura. International Journal of Environmental Research and Public Health, 19(11), 6702. https://doi.org/10.3390/ijerph19116702

24. Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57(6), 1069-1081. https://doi.org/10.1037/0022-3514.57.6.1069

25. Shutenko, E., Shutenko, A., Kuzmicheva, T., Koreneva, A., Romanova, G., & Talysheva, I. (2021). Attractive spheres of students' self-realization as practices for supporting their psychological well-being in university education. International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE), 9(2), 173-188. https://doi.org/10.23947/2334-8496-2021-9-2-173-188

26. Swacha, J. (2021). State of research on gamification in education: A bibliometric survey. Education Sciences, 11(2), 69. https://doi.org/10.3390/educsci11020069

27. Synyshyna, V.M., & Yakovytska, L.S. (2021). Subjectity of a Student-Psychologist as the Basis of His Self-Realization. Perspectives and innovations of science, Series "Pedagogy", Series "Psychology", Series "Medicine", 4(4), 387-397. https://doi.org/10.52058/2786-4952-2021-4(4)-387-397

28. Wang, J., Stebbins, A., & Ferdig, R.E. (2022). Examining the effects of students' self-efficacy and prior knowledge on learning and visual behavior in a physics game. Computers & Education, 178, 104405. https://doi.org/10.1016/j.compedu.2021.104405

29. Yanchuk, R.L. (2021). Gamification as an educational trend of the 21st century. Collection of theses "Modern digital technologies and innovative teaching methods: experience, trends, prospects", 8, 48-50. Retrieved from http://dspace.tnpu.edu.ua/bitstream/123456789/23377/1/Antcuk.pdf

30. Zahedi, L., Batten, J., Ross, M., Potvin, G., Damas, S., Clarke, P., & Davis, D. (2021). Gamification in education: A mixed-methods study of gender on computer science students' academic performance and identity development. Journal of Computing in Higher Education, 33(2), 441-474. https://doi.org/10.1007/s12528-021-09271-5