The interactive educational environment as a determinant of personality development: a case study in higher education

Інтерактивне освітнє середовище як детермінанта розвитку особистості: кейс у вищій освіті

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Abstract

The content of the key concepts of the study is disclosed; specific signs and an integral quality criterion of the formation of an interactive favorable educational environment are shown as determinants of personality development with a personally oriented approach to student learning; the components of the interactive educational environment are highlighted. To use significant formats of interactive work in the educational environment for personal development, the practical direction of digitization and modernization of the educational environment was revealed. Examples of the use of effective formats of interactive work in an interactive educational environment as determinants of personality development are given. The use of immersive technologies in an interactive educational environment is presented as a determinant of personality development. Through an empirical

Анотація

Розкрито зміст ключових понять дослідження; показані специфічні ознаки та інтегральний критерій якості сформованості інтерактивного сприятливого освітнього середовища як детермінанти розвитку особистості при особистісно орієнтованому підході до навчання студентів; виокремлено компоненти інтерактивного освітнього середовища. З метою використання вагомих форматів інтерактивної роботи в освітньому середовищі, з метою розвитку особистості розкрито практичну спрямованість цифровізації та модернізації освітнього середовища. Наведено приклади використання дієвих форматів інтерактивної роботи в інтерактивному освітньому середовищі як детермінанти розвитку особистості. Як детермінанту розвитку особистості представлено використання імерсійних технологій в інтерактивному освітньому

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study with students, we, at the ascertaining stage, by using a system of methods for measuring the state of readiness of future specialists to implement an interactive, safe educational environment as a determinant of personality development, obtained the results of an experimental study that indicate the need to improve the process of forming the readiness of specialists to implement the outlined problem through implementation of pedagogical conditions developed by us. Therefore, at the formative stage, the author's pedagogical conditions developed for students of graduation courses are implemented. Using K. Pearson's non-parametric criterion of agreement ($\chi 2$), the reliability of the obtained research data was proven. The results of the formative experiment proved the importance and originality of the research, the practical and scientific efficiency, and the effectiveness of the proposed pedagogical conditions.

Keywords: interactive educational environment, personality development, safe, educational environment, interactive work, digitization and modernization of the educational environment.

середовищі. Через емпіричне дослідження зі студентами ми, на констатувальному етапі, шляхом використання системи методів вимірювання стану готовності майбутніх фахівців до реалізації інтерактивного безпечного освітнього середовища як детермінанти розвитку особистості, отримали результати експериментального дослідження, які говорять про необхідність удосконалення процесу формування готовності фахівців до реалізації окресленої проблеми шляхом впровадження розроблених нами педагогічних умов. Тому, на формувальному етапі впроваджено розроблені для студентів випускних курсів авторські педагогічні умови. За допомогою непараметричного критерію згоди К. Пірсона ($\chi 2$) доведено вірогідність отриманих даних дослідження. Результати формувального експерименту довели важливість і оригінальність дослідження, практичну й наукову ефективність та дієвість запропонованих педагогічних умов.

Ключові слова: інтерактивне освітнє середовище, розвиток особистості, безпечне освітнє середовище, інтерактивна робота, цифровізація та модернізація освітнього середовища.

Introduction

At the current stage of education development, an effective educational environment should be considered as an atmosphere that is interactive, conducive to personality development, and based on the value guidelines of a full-fledged modern higher education (Dubatovk & Palamarchuk, 2021).

One of the important components of the formula of the new educational space of the higher school is the creation of a modern interactive educational environment as a determinant of personality development, which will provide innovative technologies and tools for learning, the necessary conditions for educators not only in the premises of an educational institution (Yastrub, 2018).

It is in such an environment that a person will be tolerant, able to work together, learn to communicate, analyze, and solve educational tasks; and be attentive to comrades in joint interaction. In this context, we are talking about a favorable interactive educational environment as a determinant of personality development, and therefore, it is important to substantiate its essence and necessity for today.

New demands of society in the training of a modern specialist require the creation of an interactive educational environment as a determinant of personality development and restructuring of the entire work of a modern higher school. The most important requirements that ensure the professional and social mobility and competitiveness of the future specialist, the convertibility of education, and the requirements that require training with the help of innovative technologies are the following: internationalization and globalization, unification and standardization, accessibility, and openness, high quality of educational services and the creation of interactive educational environment as determinants of personality development (Dotsenko, 2019).

Modernity requires the education system to prioritize the issues of humanization of education, development of personal abilities, preservation of human values, creation of an educational and subject environment, and provision of a personal approach, which will promote the manifestation of human creativity and ensure the psychological comfort of the individual in unity because it is the formation of mental functions and the

development of a person, his psychological qualities are conditioned by the environment in which the individual is (Omelchenko, 2018).

The renewal of the modern world space is characterized by the expansion of opportunities for the use of special abilities by each individual in various spheres of intellectual work. Therefore, a person who graduates from an educational institution must have creative potential, which will allow him to be able to make optimal and prompt independent decisions, to be professionally mobile, ready to develop the skills of orientation in the information space, and to constantly acquire new knowledge. Therefore, today, the problem of conceptual reorientation of vocational education on the development of personality, its creative potential, and the development of a person who is preparing for professionally qualified competitive activity is important. Today, for the formation of the creative personality of a specialist, there are acute issues of selecting the optimal content of student training and increasing the level of scientific knowledge; activation of training methods and training methods, improvement of conditions of professional training and implementation of the model of professional training and personally oriented training (Kuchai et al., 2022). Based on the relevance of the research topic, we set a goal to perform the following tasks, which justified the structure of the article: to reveal the content of the key concepts of the research; to show specific signs and an integral quality criterion of the formation of an interactive favorable educational environment as determinants of personality development with a personally oriented approach to student learning; distinguish the components of the interactive educational environment; to reveal the practical direction of digitization and modernization of the educational environment and immersive technologies in an interactive educational environment; to carry out a research-experimental verification of the effectiveness of the proposed pedagogical conditions for the formation of the readiness of future specialists to implement an interactive safe educational environment as determinants of personality development and proved their practical and scientific efficiency and effectiveness.

Literature Review

Scientists have conducted several studies in which the issue of combining or using innovative and real space in the educational process of a higher school is raised to create an interactive educational environment for personality development.

N. Dotsenko (2019) studies the ways of using audiovisual means in an interactive educational environment as determinants of personality development in training future engineers; considers the means that the information and educational environment can offer to improve the quality of assimilation of practical and theoretical provisions of general technical disciplines; in the conditions of the information and educational environment proves the importance of modern electronic interactive manuals, which navigate the course for completing tasks using personal computers or gadgets in the conditions of the information and education environment where interactive electronic educational tools are presented; considers the provision of information using QR codes in the conditions of an information and educational environment and offers tasks performed based on multimedia materials for practical work, online calculators, design and modeling tools. However, the researcher did not show the problem of his research within the framework of the global management system of the university, the possibilities of strengthening the student-centeredness and interactivity of the educational process were not singled out. Such a study was conducted by T. Konovalenko. In particular, questions regarding the possibilities of creating a student-centered interactive educational environment are revealed by T. Konovalenko (2021). Examples of experience regarding the influence on the transformation of the structure and content of the educational process of project activity are given; possibilities of increasing interactivity within the framework of the global university management system, possibilities of increasing student-centeredness and interactivity of the educational process are considered; a list of interactive types of student interaction in classes is presented, and individual examples of application in the conditions of distance learning and offline learning are described in detail. We believe that it was necessary for such a study to consider the views of foreign scientists on the essence of an effective educational environment and to reveal, within the framework of the global university management system, the conditions for the development of the individuality of a person. The study is devoted to such approaches to education. V. Dubatovk & O. Palamarchuk (2021), taking into account that the influence of the school on personality development is quite significant; the views of foreign scientists on the essence of an effective educational environment were considered, and it was proved that the school affects the development of strong-willed qualities, such as purposefulness, ambition, activity, which develop against the background of the proper functioning of the school educational environment. The all-round development of a person is presented as an innovative individual – the highest value of

society. The educational space, the modern trends of which are related to the creation of conditions for the development of individuality, which is the space in which the development of the personality is carried out, is presented as an institute of socialization of the personality, which is embodied in the following directions: social-pedagogical and social-psychological. In the modern educational process, it is important and necessary to introduce effective methods of immersive learning into the educational process in the context of training future innovative specialists. Therefore, the purpose of A. Hryhorenko's (2024) research is to identify, compare, and analyze effective methods of immersive learning in the context of training future teachers. The study presents the experience of introducing immersive technologies into the process of training future teachers; an analysis of practical experience in pedagogical education with the introduction of immersive technologies was carried out; the positive impact on the training process of future teachers of immersive technologies that develop key skills in an immersive and interactive environment and the impact of the use of interactive simulations, virtual reality and other innovative approaches that contribute to increasing practical skills, improves students' understanding of theoretical concepts of innovative educational space and shows the need the appropriate infrastructure and methodological base that must be developed for the successful integration of these technologies and for further research to determine the optimal strategies for using immersive technologies in the educational process.

In the modern scientific world, the question of combining real and virtual space in the educational process is relevant. Thus, I. Salnyk & E. Siryk (2017) studied the integration of virtual and real physical educational experiments at school.

The essence of an interactive favorable educational environment as a factor in personality formation is revealed in the research of O. Yastrub (2018), where the environment of a modern educational institution is defined as purposefully created conditions in education that ensure mutual understanding and trust between all subjects of the educational process, humane, harmonious relations between them, contribute to the formation of a situation of success in the educational process. The specific signs of the formation of this environment are determined: mobility variability, as indicators of the ability to develop a personality, coherence, and the ability to coordinate the effects of various microenvironments during the implementation of specified educational functions. "An integral criterion of the quality of a favorable interactive educational environment is its ability to provide all subjects of the educational process with opportunities for self-realization and personal development".

Several authors such as Zatsepina, N., Borin, K., Korostel, P., Fonariuk, O., & Doronina, T. (2023), Bilyk, V., Banak, R., Bardadym, O., Sokal, M., & Anichkina, O. (2023), Cherusheva, G., Nowak, B., Maksymenko, A., Kabysh, M., & Vakerych, M. (2023), emphasize the need to develop the use of innovative, non-standard, as well as critical thinking teaching methods. It is emphasized that digital technologies have influenced various spheres of social relations, and the main innovative technologies are traced. The effectiveness of interactive learning, modular learning systems, technology of level differentiation, methods of learning through research (using the project method), E-learning, and deep use of digital platforms contribute to the formation of theoretical and practical knowledge of the individual.

However, despite the significant contribution to the development of pedagogy, we see from these studies insufficient disclosure of all ways of creating an interactive educational environment as determinants of personality development, and we only talk about the reflection of certain issues of the application of ways of using audiovisual means in an interactive educational environment as determinants of personality development; creation of a student-centered interactive educational environment, some aspects of the structure of the educational environment and the main results of the theoretical analysis of foreign scientists; comparison and analysis of effective methods of immersive learning in the context of training future specialists.

Today, the problem of creating an interactive educational environment as a determinant of personality development is gaining particular relevance, and today, the priority in society is the creation of conditions for the formation of a personality capable of self-actualization, creative perception of the world, leadership, meaningful activities aimed at the development of society.

THE PURPOSE OF THE ARTICLE is to substantiate the essence of an interactive favorable educational environment as a determinant of personality development.

Methodology

To achieve the goal of the research, a set of theoretical and empirical *RESEARCH METHODS* was used: theoretical – analysis of psychological, pedagogical and philosophical literature to clarify the essence of an interactive favorable educational environment, basic approaches to its development; interpretative and analytical method, which made it possible to carry out a conceptual analysis of research sources using comparison, generalization and interpretation techniques; systematization and classification of approaches to the personal and professional development of the individual, logical-systemic analysis was carried out in order to determine the main principles of the study; empirical – methods of observation, questionnaires, conversations were applied with the purpose of research-experimental verification of the effectiveness of the effectiveness of pedagogical conditions for the formation of the readiness of future specialists to implement an interactive safe educational environment as determinants of personality development during extracurricular educational activities of students, the educational process and professional activities; statistical methods were applied to verify the reliability of experimental research results, quantitative analysis of the obtained data, generalization of conclusions based on statistical processing of the results of the formative experiment regarding the effectiveness of the proposed conditions with the aim of substantiating the essence of an interactive favorable educational environment as a determinant of personality development.

Experimental verification of the effectiveness of pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe educational environment as determinants of personality development became the goal of the pedagogical experiment.

Ethical considerations of research. To confirm the ethics of the study, we obtained the informed consent of the respondents. Before giving their consent, the participants of the experiment were fully informed about the purpose, nature, advantages, and possible risks of the study. This was done in order not to question the validity of our research.

Research and experimental work ensured the confidentiality of individual diagnostic results and was organized based on the principles of objectivity of assessment results, the scientific validity of diagnostic methods, and the reality of the conditions of professional and pedagogical training of each individual in a higher education institution.

Research and experimental work involved the application of objective calculation methods. The results of the experimental study were obtained by a system of methods for measuring the state of readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development: observation, questionnaires, analysis of student learning success, performance of individual research tasks, control, independent, practical work, etc.

During the ascertainment experiment, by surveying respondents, answers were received that indicated the presence of an initial level of cognitive readiness of the respondents. The results of the ascertainment experiment indicate that the vast majority of respondents have an average level and an initial level of readiness for the implementation and design of an interactive, safe, educational environment as determinants of personality development The obtained results indicate the need to improve the process of forming the readiness of specialists to implement an interactive, safe, educational environment as determinants of personality development through the implementation of pedagogical conditions.

In 2023–2024, a formative experiment was conducted with students of graduation courses. The absence of a special selection of respondents for EG and CG contributed to ensuring the naturalness of the experiment and the representativeness of the sample.

The purpose of the formative experiment was to test the effectiveness of the pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development during extracurricular educational activities of students, the educational process, and professional activities; generalization of conclusions based on statistical processing of the results of the formative experiment regarding the effectiveness of the proposed conditions. At the formative stage of the experiment, research stages were developed, an innovative educational experimental content module, various organizational forms, methods, discussion of reports at and international scientific and practical conferences on professional training of future specialists were

implemented, means of forming the readiness of future specialists to implement and design an interactive, safe, educational environment as determinants of personality development. Following modern trends in the development of higher education, at this stage, the content component of the formation of the readiness of specialists to implement an interactive, safe educational environment was specified as a determinant of personality development, the leading components of this type of training were singled out (stages, content, structure, purpose, diagnostic tools, functions, means, forms, methods of training organization.

To justify the main goal in EG, a practically oriented heuristic method, heuristic conversation, case method, discussion, solution of project and methodical tasks, method of creative projects, and analysis of design systems were applied.

In CG, the educational process was carried out in the conditions of the traditional organization of professional training of students.

In the process of the formative experiment, we obtained results that indicate a discrepancy between indicators of the cognitive criterion of readiness, which is significant. In EG and CG, at the end of the study, the discrepancy was at a personal-oriented – high level – 9.3% in favor of the experimental groups. At the collective-oriented – average level, 6.7% of the changes occurred as a result of an increase in high-level indicators and a simultaneous decrease by 15.3% of the reproductive-oriented – initial level of readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development.

In comparison with the control groups, the dynamics of changes in the studied readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development according to the operational and activity criterion among students of the experimental groups were established:

–   Here was an increase of 9.1% at the personal-oriented – high level and by 1.6% at the collective-oriented – medium level due to the increase of the high level;
–   By 10.7%, there was a decrease in the number of students at reproductive-oriented – primary level.
–   Compared with CG, the dynamics of changes in the readiness of EG respondents to implement and design an interactive, safe, educational environment as determinants of personality development according to the personal criterion revealed
–   An 8.6% increase in respondents with a high personal-oriented – level and a 1.5% increase in respondents with a collective-oriented – average level;
–   By 10.1%, we observe a decrease in the number of respondents with a reproductive-oriented – initial level of readiness.

The results of the assessment of readiness to implement and design an interactive, safe, educational environment as determinants of personality development in EG according to the competence criterion, in comparison with CG, were as follows:

–   By 7.1%, we observe growth at the personal-oriented – high level, and at the collective-oriented – average level, we observe growth of 4.1%;
–   By 10.7%, we observe a decrease in the number of respondents with a reproductive-oriented – initial level of readiness.

As a result of the formative experiment, positive dynamics of changes were noted for each of the criteria of readiness of EG respondents to implement and design an interactive, safe educational environment as determinants of personality development. Statistical processing of the results of the studied readiness to implement and design an interactive, safe, educational environment as determinants of personality development among EG students proved a significant advantage over the results obtained by CG respondents.

The significance of the results of the formative experiment was confirmed by the methods of mathematical statistics, as well as the importance and effectiveness of the proposed pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development.

To a large extent, research depends on the reliability and accuracy of the data. As part of the work, the quality of data collection and analysis contributes to the formation of thorough conclusions, which is crucial for academic success.

Using K. Pearson's (1896) non-parametric criterion of agreement ($\chi 2$), the reliability of the obtained research data was proven. The results of the formative experiment proved the practical and scientific efficiency and effectiveness of the proposed pedagogical conditions.

Results and Discussion

Content of key research concepts.

Development potential: not every educational environment has developmental potential, but only that environment in which favorable conditions are created for personality formation. A favorable environment is an environment associated with the integration and humanization of the social environment's influence on personality development. In this context, let's emphasize the inseparability of the factors of the educational environment, the human factor, and the integrity of the system "teacher-student of education – educational innovation environment" (Shuliak et al., 2022).

We consider the educational environment in the following areas: the external environment, which includes the physical environment that surrounds a person, and the internal environment, which creates a psychological climate, a climate of innovative communication and education.

The concept of a "favorable educational environment" includes in its content that the development, education, training, and socialization of a person are not only influenced by the educational and educational actions of the teacher and depend not only on the individual and psychological characteristics of the person. Formation and development of personality its actions take place in certain socio-cultural, interpersonal, spatial, and subject conditions, which can hinder or facilitate personality development under the influence of pedagogical actions. Therefore, it is necessary to take into account the theory of human development when creating a favorable educational environment in educational institutions, where the environment should meet the developmental needs of a person in a socio-cultural context, the education of qualities: initiative, diligence, trust, autonomy, the desire to participate in the development of common rules, the ability to learn, cooperation, respect for peers and teachers, development and maintenance of friendly relations, success and responsibility (Bibyk, 2017).

Having considered the content of the key concepts of the research and emphasizing the inseparability of the factors of the educational environment, the human factor, and the integrity of the system "teacher-learner of education, innovative environment", we believe that a favorable educational environment will be of high quality if it can provide the opportunity to meet the educational needs of all subjects educational process, as well as their personal self-development, development, which are important consequences for educational practice.

The systematization of the properties of the interactive environment and the signs of nature, where personality formation is carried out, to reveal the content of the interactive educational environment as determinants of personality development, determine the expedient need to interpret the concept of "interactive". Interactive is capable of interaction and dialogue, just as the concept of "interactive" comes from the word "interact" (inter-mutual and act-to-act) (Busel, 2005).

Therefore, we analyze the interactive educational environment as a determinant of personality development as:

− Purposeful interaction between the teacher and students of education, the students themselves, their stay in the mode of constant joint action, dialogue, and conversation;
− A system of pedagogical and organizational factors that have a permanent influence on the education of the moral qualities of the individual, among which are the means of professionally oriented education of the individual;
− A system for ensuring the use of interactive methods and forms in the educational and educational work of education seekers in the educational innovation space to promote the formation of personality

self-presentation skills, which encourages education seekers to defend their own opinions and beliefs, to look for different ways of expressing their own opinions and judgments;

- The environment is dynamic and mobile, which takes into account the individual characteristics and needs of those seeking education and constantly responds to the changing conditions of society (Mytnyk et al., 2024).

Specific features and an integral quality criterion of the formation of an interactive favorable educational environment as determinants of personality development with a personally oriented approach to student learning.

Specific signs of the formation of an interactive favorable educational environment as a determinant of personality development are:

- Coherence, as the ability to coordinate the influences and actions of various microenvironments during the implementation of educational functions;
- A favorable interactive educational environment is a dynamic environment that constantly responds to the changing conditions of society, takes into account the needs of the student of education and his individual characteristics;
- The openness of the education system, which conditions and foresees the existence of special types of communicative activity and specific types of relationships that are manifested in dialogic, ethical, and positionally equal interaction;
- Mobility and variability, which are indicators of the ability to develop a personality (Rojas-Bahamón & Arbeláez-Campillo, 2023).

An integral quality criterion of an interactive favorable educational environment as a determinant of personality development is its ability to provide opportunities for creativity, personal development, and self-realization to all subjects of the educational process (Yastrub, 2018).

The development of the personality, the formation of its psychological qualities, and mental functions are conditioned by the innovative environment in which the personality is (Omelchenko, 2018).

Components of an interactive educational environment as determinants of personality development.

Interactive educational environment We consider the educational environment as a structure that includes the following components:

- *Human factor* – selection of educational process applicants, filling of study groups and influence on the social behavior of educational process applicants, features and success of educational process applicants, ethnic characteristics, quality of specialist training, gender and age structure of the educational process applicants contingent;
- *Physical environment* – educational premises, the spatial structure of educational accommodations, size, design, conditions for accommodation, and movement of students of the educational process;
- *Training program* – forms of training activities, methods and style of training, training technologies, the innovative nature of the content of training programs, and the nature of control (Dubatovk & Palamarchuk, 2021).

Digitization and modernization of the educational environment. The use of significant formats of interactive work in the educational environment for personality development.

Recently, we have been witnessing a powerful modernization and digitization of the educational environment in the global educational space. In this regard, traditional interpersonal communication has become increasingly difficult due to the presence of obstacles in the form of tablets, computer screens, and smartphones. Digitization and modernization of the educational environment began its existence somewhat earlier. Back in 2018, sociological studies were conducted that showed that 90% of American teenagers prefer typing messages instead of verbal communication. At that time, 13-17-year-olds received and sent approximately 40 messages per day (Anderson & Jiang, 2018).

Young people who study often realize the value of interpersonal communication, but they lack communication, they cannot do without typing messages, using messengers, chats, etc. Students of higher

education institutions and school pupils prefer "printed communication" instead of live communication in social networks ("likes" and comments) (Balakireva et al., 2019). Such statistics demonstrate the insufficiency of interactive activity in the educational process – an urgent problem of our time. Excellent opportunities for organizing communication are created under any conditions by modern technical means, however, in this direction, an additional task is to increase the motivation of young people to understand the value of live communication and verbal interaction. The interactive nature of the organization of the educational process and the interactivity of learning is a characteristic feature of the modern educational process using computer technologies, which, based on the activation of the processes of a sense of cooperation, reflection, empathy, etc., contributes to the establishment of subject-subject interaction between students and the teacher and students among themselves (Volkova, 2018).

The use of significant formats of interactive work in the educational environment for personality development is of great importance for the modern educational process. The most effective in the educational process is the use of a buzz-group lecture, a lecture with insufficient information, a problematization lecture, an informal lecture, a contract lecture, etc.

The basis of the classes was the following conditions to promote the activation of student communication for personality development in an interactive educational environment:

- The teacher's use of his personal experience as an example;
- As a starting point in the study of the topic – use of the existing experience of the students of the educational process;
- Elucidation of motivation factors of education seekers;
- Consideration of wishes and discussion of favorite learning styles;
- Understanding of education seekers for what purpose it is necessary to perform exercises;
- In the absence of student activity – availability of a flexible lesson plan with the possibility of changing interaction modes or exercise format;
- Activity and initiative in the occupation of education seekers, not the teacher;
- Application of reflection and feedback.

The classes used the following modes of interaction, which involve learning through communication. Innovative types of work were used by these conditions and actively encouraged students to communicate: jigsaw learning, pyramid groups, cross-over groups, Socratic technique, brainstorming, role-playing, business games, open learning, projects, workshops, simulations, guided reading, debates, etc. (Kozmenko et al., 2022).

We will give examples of the use of some formats of interactive work in an interactive educational environment as determinants of personality development.

The "Speaking corners" exercise, for which ambiguous statements are prepared in advance, contributes to the development of the ability to express and substantiate one's own opinion, the development of critical thinking, and the skillful conduct of a discussion. Students in groups discuss their reasoning and present a collective opinion regarding the prepared statement. Students summarize their thoughts and draw conclusions. In the conditions of distance learning using the functionality of virtual rooms, this exercise was used in Zoom video conferences.

An important type of work was the "Living Library", which was carried out during the training. In groups, students get to know "book" people who encourage students to engage in discussion, ask questions, and not just share interesting information. By moving the "books" in the Zoom rooms, the exercise was used in a virtual format. Poll Everywhere, Kialo, and LessWrong platforms are used to conduct discussions and debates in a virtual environment (Konovalenko, 2021).

The use of immersive technologies in an interactive educational environment as determinants of personality development.

Immersion technologies are actively used in institutions of both general education and higher education, which allows for the involvement of students in the learning process and improves the quality of learning. Methodological approaches and educational programs developed based on international experience contain advanced methods of using immersion technologies, which allow an interactive educational environment

to increase student motivation, optimize the learning process, and contribute to personality development (Budnyk et al., 2022).

Immersiveness – this is two-way communication in the learning process, the unification of the human consciousness and the subconscious of the individual, the relaxation of "immersion", during which a deep involvement in a certain activity occurs (Sokolyuk, 2021) by the teaching methods of the group.

Immersion of the individual in the educational environment (immersive environment) and navigation in it makes it possible to "consider the process of including the subject in the "world" of learning, where he can live according to his own laws, which does not correspond to the physical, real-world" (Klochko, 2021).

Different types of immersion are distinguished – immersion in the subjective world, immersion in the virtual environment, and immersion in the physical environment (Kunderevych et al., 2021).

Immersive technology is "an interdisciplinary field that requires the synthesis of many technologies, such as computer graphics, computer-aided design, machine learning, and mobile programming, and requires theoretical knowledge in various fields, such as linear algebra, projection and differential geometry, theory probability, and optimization" (Soroko et al., 2021).

Due to deep immersion in the virtual environment, immersive technologies in education increase the importance of visual aids in the process of acquiring knowledge.

The immersive approach in education includes in the content of its concept "a strategy of cognition, a set of techniques and methods of interactive interaction of the subjects of the educational process for development and self-development of the personality of students in an artificially created virtual environment" (Dymova, 2022).

The presence of several key moments in an interactive educational environment provides an immersive approach that implements the principles of visibility of higher education for personality development. The principle of immersion expands and complements the immersive approach, taking into account technological possibilities and modern trends (Knysh et al., 2024).

In addition to the principle of immersion, the creation of an interactive, immersive educational environment is based on such principles as: selectivity, self-organization, interactivity, presence, physical immediacy, and subjective mediation. We see that the interactive, immersive educational environment is systemic, dynamic, plastic, and holistic. The main advantages of interactive, immersive educational environments are their dynamism, interactivity, and clarity (Shetelya et al., 2023), as well as the possibility of their use in distance education. For this, there are several interactive programs and interactive educational platforms that provide an opportunity to create an immersive educational environment: Altspace VR, InMind, Labster, HistoryMaker VR, zSpaceLabs, High Fidelity, Google Expeditions, The VR Museum of Fine Art Vtime, NeosVR, Universe Sandbox 2, Google EarthVR, The Body VR, etc.

Let's highlight the components of immersive technologies, which are important in an interactive educational environment as determinants of personality development Dymova, I. (2022):

− *Mixed reality (MR)* – integration of the real-world environment and virtual content, which serves to ensure interaction between elements;
− *Augmented reality (AR)* – digital content is superimposed on a certain physical process;
− *Virtual reality (VR)* – the physical environment of the user replaces the digital environment;
− *TelePresence* – a form of remote robotic control in which the human operator feels like he is in another place;
− *Holography* – creating a three-dimensional image in space that can be explored from all sides;
− *FPV drone flight* – so that the user can see the environment from the first person (FPV) – the use of an unmanned aerial vehicle (UAV) with a camera that wirelessly transmits video to a headset, glasses, mobile device, etc.;
− *Digital double* – a virtual replication of a real-world object that connects to the object to receive information so that it can display its current status.

AR, VR, MR headsets, 3D audio, 3D displays, speech recognition, gesture recognition, haptic devices, spatial perception, cameras, drones, etc., are aids for immersive technologies (Dotsenko & Van, 2023).

Today, immersive technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) are gaining more and more popularity in education as a powerful tool in an interactive educational environment, determinants of personal development, to engage learners in the learning process and improve quality of education.

Immersive technologies provide significant support to educators, as they motivate learners, regardless of their skills, to help improve and sustain education. The use of AR, VR, and MR allows simulation of real situations, interactive training, and practical exercises for future specialists. Such an approach contributes to the improvement of the skills of those seeking education and increasing their motivation (Hryhorenko, 2024).

In the conditions of the information and educational environment, the study of professional disciplines requires the use of audiovisual interactive tools that can be submitted using QR codes. Interactive laboratory works are accompanied by a QR code, each lecture contains interactive audiovisual content and is supplemented by interactive content (Hlynsky & Ryazhska, 2018). In the conditions of the information-educational environment, when studying professional disciplines, it is expedient to consolidate theoretical material with the help of educational computer interactive simulators. The use of Moodle (the distance learning platform) provides the participants of the educational process with free access to the discussion of the assigned tasks and their solutions, allowing the teacher to save time in checking the tasks (Mahometa et al., 2018).

The use of virtual laboratories of computers and interactive simulators is important for the interactive educational environment as a determinant of personality development. For the professional training of students of higher education, it is necessary to combine all the components of the course in a single environment; it is not enough to use only educational simulators (Dotsenko, 2019).

Recognizing the scope and possible biases, we will highlight the limitations of the study. The uniqueness of our research is a mandatory criterion of the conducted research work. The research is limited by the chosen topic, the chosen pedagogical conditions, and the method of experimenting. The limitation is private, that is, established by the researchers themselves.

With the help of private research, we focused on the chosen issue from the perspective of the authors. So, the limitations of our research are the clearly defined possibilities of using the chosen context and methods.

Results of an experimental study.

Generalization and interpretation of the results of the conducted pedagogical experiment became the final stage of the research. We will describe the research-experimental verification of the effectiveness of pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development.

The conducted research prompted us to determine the pedagogical conditions that determine the effectiveness of forming the readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development:

– Application of methods of forming professional, positive motivation of future specialists to design an interactive, safe, educational environment as determinants of personality development;
– Step-by-step formation of specialists' readiness to implement an interactive, safe, educational environment as determinants of personality development;
– Implementation of an interactive, safe, educational environment as a determinant of personality development in professional and pedagogical activity.

The process of modeling the interactive, safe, educational environment as determinants of personality development contributed to the content, correction of tasks, the development of the organizational system of the methodology for the formation of the readiness of future specialists for the implementation of the interactive, safe educational environment as determinants of personality development to obtain the expected

results based on predictive assumptions, which provided such a process with an educational space greater flexibility, personal orientation, alternative for all participants of the educational process in the maximum individualization of their educational trajectories.

Experimental verification of the effectiveness of pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe educational environment as determinants of personality development became the goal of the pedagogical experiment.

Effective factors influencing the formation of an interactive, safe, educational environment as determinants of personality development are the level of development of students' skills, the level of their professional and pedagogical knowledge, direction, and development of motivation to master the personal qualities necessary for creating a safe, professional space.

The confirmatory experiment was aimed at determining the levels of readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development.

Research and experimental work ensured the confidentiality of individual diagnostic results and was organized based on the principles of objectivity of assessment results, the scientific validity of diagnostic methods, and the reality of the conditions of professional and pedagogical training of each individual in a higher education institution.

Research and experimental work involved the application of objective calculation methods. The results of the experimental study were obtained by a system of methods for measuring the state of readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development: observation, questionnaires, analysis of student learning success, performance of individual research tasks, control, independent, practical work, etc.

Purposefulness in the performance of tasks of individual and independent work and the level of cognitive activity of students revealed the results of diagnostics.

During the ascertainment experiment, by surveying the respondents, answers were received that indicate the presence of an initial level of cognitive readiness of the respondents, which is characterized by a clear demarcation of the concepts: "educational environment", "interactive, safe, educational environment", "personality development".

Students experienced difficulties when answering questions about awareness of actions to design an interactive, safe, educational environment as determinants of personality development (Fig. 1):

–   89% of respondents named only individual factors (preventing all manifestations of violence in an interactive educational environment, ensuring positive emotional relationships as determinants of personality development, creating a comfortable, interactive educational environment) and supplemented their answers with signs of satisfaction in the cognitive activity of the basic needs of the individual, preservation of self-esteem, support, and assistance, development of abilities and inclinations in the educational environment;
–   11% of respondents (only a small number of students) demonstrated a correct understanding of the concept and listed the features of an interactive, safe educational environment as determinants of personality development.
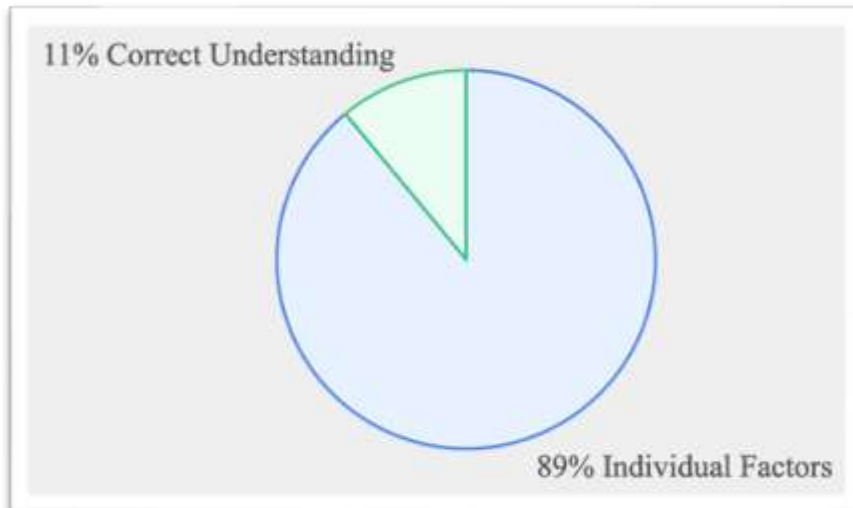
ISSN 2322- 6307

Figure 1. Understanding of factors in the educational environment.

63% of respondents (the majority of students) defined the term "security" and the concept of "safe educational environment" correctly.

But to the proposed question, "What methods of implementing an interactive, safe, educational environment as determinants of personality development do you use in educational activities?" the answers were different: participation in a survey on the prevention and prevention of bullying, compliance with the rules of safe handling of unfamiliar objects in society, observance of tolerance in the student body, formation of a positive microclimate, etc.

The answers to questions about the skills and qualities necessary for the effective implementation and design of an interactive, safe, educational environment as determinants of personality development were as follows (Fig. 2):

−   75% of respondents identified the advantages of administrative and communication skills;
−   25% of respondents identified the advantage of their own example and the ability to promote tolerance, social-emotional literacy, non-violent communication skills, and the ability to cooperate.
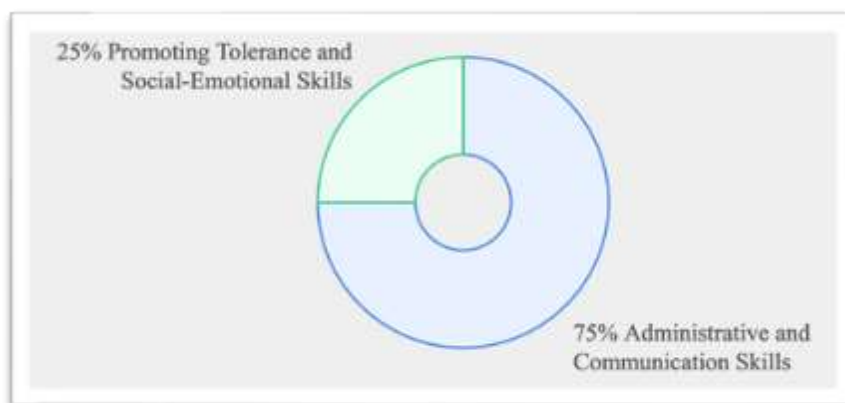

Figure 2. Advantages identified by respondents.

The results of the ascertainment experiment indicate that the vast majority of respondents have an average level and an initial level of readiness to implement and design an interactive, safe, educational environment as determinants of personality development, and only 20% of respondents managed to achieve a high level of readiness of specialists to implement an interactive safe educational environment as determinants personality development.

The obtained results indicate the need to improve the process of forming the readiness of specialists to implement an interactive, safe, educational environment as a determinant of personality development through the implementation of pedagogical conditions.

In 2023–2024, a formative experiment was conducted with students of graduation courses. The absence of a special selection of respondents for EG and CG contributed to ensuring the naturalness of the experiment and the representativeness of the sample.

The purpose of the formative experiment was to test the effectiveness of the pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development during extracurricular educational activities of students, the educational process, and professional activities; making generalizations and conclusions based on statistical processing of the results of the formative experiment regarding the effectiveness of the proposed conditions. At the formative stage of the experiment, research stages were developed, an innovative educational experimental content module, various organizational forms, methods, discussion of reports at and scientific and practical conferences of the international level on the professional training of future specialists were implemented, means of forming the readiness of future specialists to implement and design an interactive, safe, educational environment as determinants of personality development. By modern trends in the development of higher education, at this stage, the content component of the formation of the readiness of specialists to implement an interactive, safe educational environment as a determinant of personality development was specified, the leading components of this type of training were singled out (stages, content, structure, purpose, diagnostic tools, functions, means, forms, methods of training organization.

To justify the main goal in EG, a practically oriented heuristic method, heuristic conversation, case method, discussion, solution of project and methodical tasks, method of creative projects, and analysis of design systems were applied.

In CG, the educational process was carried out in the conditions of the traditional organization of professional training of students.

In the process of the formative experiment, we obtained results that indicate a discrepancy between indicators of the cognitive criterion of readiness, which is significant. In EG and CG, at the end of the study, the discrepancy amounted to a personal-oriented – high level – of 9.3% in favor of the experimental groups. At the collective-oriented – average level, 6.7% of the changes occurred as a result of an increase in high-level indicators and a simultaneous decrease by 15.3% of the reproductive-oriented – initial level of readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development.

In comparison with the control groups, the dynamics of changes in the researched readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development according to the operational and activity criterion among the students of the experimental groups were established:

– There was an increase of 9.1% at the personal-oriented high level and by 1.6% at the collective-oriented average level due to the growth of the high level;
– By 10.7%, there was a decrease in the number of students at the reproductive-oriented primary level.

Compared to CG, the dynamics of changes in the readiness of EG respondents to implement and design an interactive, safe, educational environment as determinants of personality development according to the personal criterion revealed:

– An 8.6% increase in respondents with a high level of personal orientation and a 1.5% increase in respondents with an average level of collective orientation;
– By 10.1%, we observe a decrease in the number of respondents with a reproductive-oriented initial level of readiness.

The results of the evaluation of the readiness to implement and design an interactive, safe, educational environment as determinants of personality development in EG according to the competence criterion, in comparison with CG, were as follows:

– By 7.1%, we observe growth at the personal-oriented high level, and at the collective-oriented medium level, we observe growth of 4.1%;
– By 10.7%, we observe a decrease in the number of respondents with a reproductive-oriented initial level of readiness.

So, as a result of the formative experiment, according to each of the criteria of readiness of EG respondents to implement and design an interactive, safe, educational environment as a determinant of personality development, positive dynamics of changes were noted. Statistical processing of the results of the studied readiness to implement and design an interactive, safe, educational environment as determinants of personality development among EG students proved a significant advantage over the results obtained by the respondents of the control groups.

The significance of the results of the formative experiment was confirmed by the methods of mathematical statistics, as well as the importance and effectiveness of the proposed pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development.

Using K. Pearson's non-parametric criterion of agreement (χ 2), the reliability of the obtained research data was proven. The results of the formative experiment proved the practical and scientific efficiency and effectiveness of the proposed pedagogical conditions.

Conclusions

To use significant formats of interactive work in the educational environment for personal development, the practical direction of digitalization and modernization of the educational environment was revealed.

Experimental verification of the effectiveness of pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe educational environment as determinants of personality development became the goal of the pedagogical experiment.

Research and experimental work involved the application of objective calculation methods. The results of the experimental study were obtained by a system of methods for measuring the state of readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development: observation, questionnaires, analysis of student learning success, performance of individual research tasks, control, independent, practical work, etc.

During the ascertainment experiment, by surveying respondents, answers were received that indicated the presence of an initial level of cognitive readiness of the respondents. The obtained results indicate the need to improve the process of forming the readiness of specialists to implement an interactive, safe, educational environment as determinants of personality development through the implementation of pedagogical conditions.

The purpose of the formative experiment was to test the effectiveness of the pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as a determinant of personality development during extracurricular educational activities of students, the educational process, and professional activities; generalization of conclusions based on statistical processing of the results of the formative experiment regarding the effectiveness of the proposed conditions.

As a result of the formative experiment, positive dynamics of changes were noted for each of the criteria of readiness of EG respondents to implement and design an interactive, safe educational environment as determinants of personality development.

The significance of the results of the formative experiment was confirmed by the methods of mathematical statistics, as well as the importance and effectiveness of the effectiveness of the proposed pedagogical conditions for the formation of the readiness of future specialists to implement an interactive, safe, educational environment as determinants of personality development.

Recognizing the scope and possible biases, we will highlight the limitations of the study. The uniqueness of our research is a mandatory criterion of the conducted research work. The research is limited by the chosen topic, the chosen pedagogical conditions, and the method of experimenting. The limitation is private, that is, established by the researchers themselves.

With the help of private research, we focused on the chosen issue from the perspective of the authors. So, the limitations of our research are the clearly defined possibilities of using the chosen context and methods.

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