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Development of information and didactic tools for practice-oriented education in universities

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Abstract

Relevance. The relevance of the research is determined by the change in the educational environment, which contributes to the search for new innovative methods of training qualified specialists capable of solving any tasks within their professional activities.

Purpose. The purpose of the paper is to analyze the characteristics of practice-oriented education in Kazakh higher educational institutions in accordance with the development of information and didactic tools.

Methodology. General scientific theoretical methods were used in the work, such as comparison, synthesis, system analysis, systematization, generalization and statistics, the method from abstract to concrete based on systemic and structural-functional approaches.

Results. The author analyzed a number of scientific and methodological Kazakh and foreign sources to determine the semantic component of the phenomena of "practice-oriented education" and "information didactic tools". The current state was considered of the practice-oriented conception of learning in Ukrainian, Russian and Australian universities. The interpretation was substantiated of information and didactic means as material tools of professional interaction of subjects of the educational process. Practice-oriented education was analyzed in universities of the Republic of Kazakhstan, and key information and didactic tools were identified, including very open online courses, case-methods "Workbook", individualized electronic education programs. The promising vector was confirmed of the development of practice-oriented education in Kazakh universities based on statistical data of the state of previous years.

Conclusions. It became evident that contemporary educational paradigms prioritize an activity-based approach, necessitating the refinement of pedagogical foundations. Various studies, both local and international, were scrutinized to grasp the nuances of developing informational teaching tools and integrating practical learning methodologies. It was established that a comprehensive analysis of these concepts is imperative. "Practice-oriented education" emerged as a

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holistic system of innovative teaching techniques designed to enhance essential aspects of a student's development, encompassing psychological, cognitive, motivational dimensions.

Keywords: innovative education; didactics; activity approach; applicants for higher education; educational practice; information and didactic competence.

Introduction

Innovative trends characterize the modern social and cultural space, therefore the role and place of a person change qualitatively in any sphere of its activity. Similar changes also concern the field of education, which defines a new format focused on the possession of both theoretical foundations, and practical skills that contribute to the further professional development of each individual applicant for higher education.

One way or another, the existing principles of pedagogical and educational activities cease to meet the requirements of universities and, in particular, the requirements of a new practice-oriented educational approach resulting in a need to revise the theoretical basis of education, namely, update the information didactic means of future specialists in a particular field.

The problem of developing information didactic tools for the practice-oriented approach in universities has repeatedly become the subject of research by many Kazakh and foreign scientists. For example, O. Vaganova, Z. Smirnova and S. Kaznacheeva [1] studied the methodological foundations of the practice-oriented approach, the key formation stages of professional competencies in the perspective of the gradual introduction of this approach, as well as the didactic content of practice-oriented education. Ukrainian researcher N. Gramatik [2] considered practice-oriented education in the context of teaching a separate discipline "Biotechnology" in the process of training future biologists.

Thus, the scientist concluded that high-quality training of applicants for higher education was possible in this specialty using a biotechnological cluster and a space for improving the subject competence of specialists in the biological field, which contributed to the equivalent development of theoretical and practical knowledge [2].

The achievements of Australian scientists are interesting for scientific research. This includes such author as L. Mann, R. Chang, S. Chandrasekaran [3]. In their work, the authors describe the structure of practice-oriented education on the example of future engineers. In their opinion, practice-oriented education includes proper engineering practice, support for students in the process of their formation as professionals and, not least, the possibility of combining both study and work. Thanks to this approach, implemented at the Academy of Engineering Practice of Swinburne University of Technology, applicants for higher education will be able to receive a theoretical basis and immediately consolidate it in practice.

Turning to the research of Kazakh scientists, it is worth noting the special beliefs of authors such as Y. Nabi, N. Zhaxylykova, G. Kenbaeva [4] and S. Mulikova, M. Abdakimova, S. Kenzhebaeva [5].

Y. Nabi et al. [4] considered the features of a practice-oriented approach in their work in the context of a historical retrospective of the development of the Kazakh education system over the years of independence. The

researchers concluded that the theoretical basis needed to be improved in the form of didactic materials for practice-oriented education in accordance with positive foreign experience [4].

At the same time S. Mulikova, M. Abdakimova, S. Kenzhebaeva [5] conducted an empirical study to determine the level of satisfaction with the quality of education of students and employers. The scientists found out that approximately 30% of students of Karaganda University of Economics were dissatisfied with the results of the internship; about 20% of employers were dissatisfied with the quality and level of training of students, which manifested in inability to apply theory in practice [5].

Thus, we see that the Kazakh education system is characterized by a discrepancy between the knowledge gained, and the knowledge needed for further practical activities, and therefore the issue is actual to find appropriate methods of updating information didactic tools for practice-oriented education.

Based on the above, the purpose of the paper is to analyze the features of the introduction of practice-oriented education in universities of Kazakhstan in accordance with the development of information didactic tools. To achieve this goal, the following tasks were set:

1. To substantiate the features of practice-oriented education based on a definitive analysis of its definitions.
2. To find out the semantic designation of the concept of "information didactic means" in the context of the practice-oriented approach.
3. To analyze the methods of improving information and didactic tools for practice-oriented education in universities of Kazakhstan.

Materials and Methods

The development problems of information didactic tools were studied in three stages in the context of the implementation of practice-oriented education in higher educational institutions, in particular in Kazakhstan, following the tasks set at the beginning of the work.

The first stage of the scientific work provided for the analysis of Kazakh and foreign scientific and methodological literature over the past 3-5 years to define the concept of "practice-oriented education".

The second stage of the study was aimed at studying the concept of "information didactic means", in particular, a comparative analysis of the views of scientists was carried on the interpretation of this concept, as well as classification methods. The third stage of the study provided for the analysis of the current state of the implementation of practice-oriented education in universities of Kazakhstan and the development of information didactic tools, in connection with which statistical data of the Ministry of Education and Science of the Republic of Kazakhstan were used.

The theoretical basis of the research was a number of scientific and methodological sources of Kazakh and foreign scientists with the problems of determining,

comparing and improving didactic materials for the implementation of practice-oriented education in higher education institutions on the example of Ukraine, Russia, Australia and Kazakhstan.

The achievement of this goal made it possible to use general scientific theoretical research methods, including system analysis, synthesis, comparison, systematization, the method of statistics and generalization, as well as the method from abstract to concrete. Thus, the method of system analysis was used in the study of the theoretical basis of scientific work, which allowed us to consider practice-oriented education in the integrity of its structural elements.

The synthesis method contributed to the joint study of such concepts as "information didactic tools" and "practice-oriented education". The comparison method helped to form an exhaustive interpretation of these concepts in the correlation of different views of scientists, as well as to find common principles of interpretation, depending on national education systems.

The method of systematization made it possible to streamline the structural components of a practice-oriented approach to learning, including the organization of practical types of work, the creation of complex conditions, the introduction of practice-oriented technologies, the development of information forms of learning, as well as to structure the classification of information didactic means of practice-oriented education.

The statistical method made it possible to confirm the relevance of the chosen topic, as well as to justify the prospects for further implementation of practice-oriented education in Kazakh universities. The method of generalization contributed to summing up the selected problem of the development of information didactic tools for the implementation of practice-oriented education in universities of the Republic of Kazakhstan.

At the same time, the method from abstract to concrete helped to specifically define the object of research, in particular, to consider the Kazakh methods of practice-oriented education in higher educational institutions and ways to improve information and didactic tools in the field of the international system of training future specialists.

Thus, the scientific research was conducted based on systemic and structural-functional approaches in the logic of the development of practice-oriented education in its integrity and comparability. These scientific approaches contributed to a comprehensive interdisciplinary study of the problem, taking into account the criteria component. It is worth noting that the influence of practice-oriented training was determined on the process of competence formation of a higher education applicant using criteria such as motivational, cognitive, activity and psychological, which in the system form the personality of a professional in a particular field of activity.

Results and Discussion

The problem of developing information didactic tools for the practice-oriented education in universities reside in a

semantic definition of two aspects, in particular the concept of "practice-oriented education" and "information didactic tools". In modern pedagogical discourse, the phenomenon of "practice-oriented education" has many interpretations.

This approach in teaching has qualitative differences compared to traditional teaching methods, since its components are focused precisely on the formation of competencies that a particular specialist will use in professional activities in the future. Researchers B. Abykanova et al. [6] believe that practice-oriented education is a system of didactic tools that form common functional and professional competencies.

Such a view on the definition of this educational approach coincides with the goal of the modern education system and provides for the synthesis of two separate components in the context of the chosen training, namely, the organization of practice (production and pre-graduate), as well as the introduction of professionally oriented technologies [6].

In this case, we are talking about methodological content, which consists of active forms of teaching and methods of contextual learning. S. Mamychenko [7] believes that practice-oriented education implies "mastering psychological and subject-oriented activities".

Such an interpretation well defines the modern value views of professionals, among which the primary place is occupied by psychological preconditions, such as motivation, self-control, emotion management, stress tolerance and others. However, as the researcher notes, even the competence-based approach of teaching provides for the presence of universal components, namely "the purpose, subjects, content, forms of organization and learning outcomes" [7].

One way or another, higher education should form personal structures, which in the future will be the basis for mastering the appropriate experience. The special significance of this practice-oriented approach in teaching also lies in its correlation with acmeological tasks. At the same time, the scientist argued that the practice-oriented method provides for both theoretical classes, i.e. lectures, and practical, i.e. seminars, since only the simultaneous development of the designated components is able to form a full-fledged specialist in a particular field [7].

We find a similar point of view in the work of M. Olesova [8]. According to the author, practice-oriented education is an integral system that consists of the following types of activities: diversity of practice, practice-oriented technologies, innovative employment methods, complexity and integrity of training (Figure 1). The researcher concludes that the practice-oriented teaching method increases the level of competitiveness, develops the desire for creative activity, and also actually changes the "personal status of the student", in which the applicant for higher education becomes a separate independent, self-governing unit of the educational process [8]

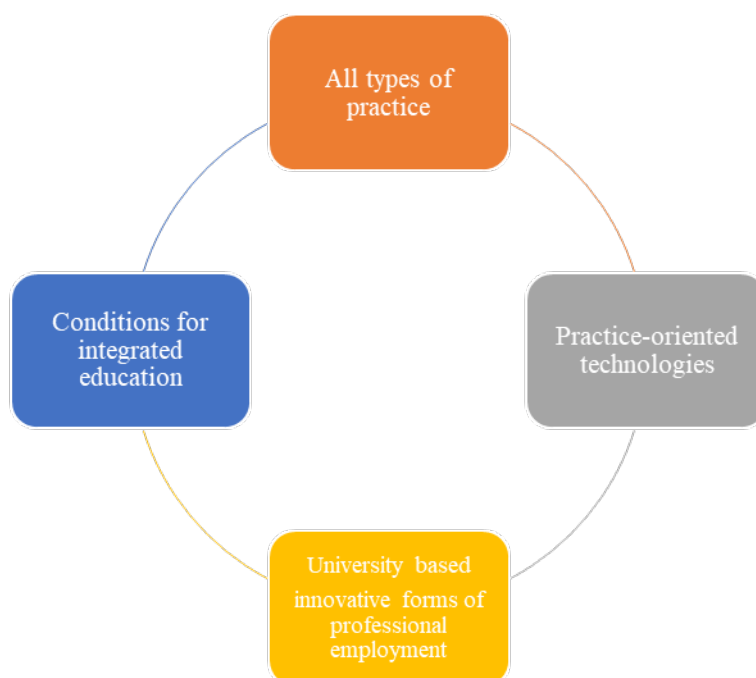


Figure 1. Structural elements of practice-oriented education based on a systematic approach

In addition to theoretical analyses of the definition of a practice-oriented approach, special importance in the scientific community is attached to empirical studies of this method of teaching. E. Chernysheva, D. Dakhin and A. Brekhova [9] argued about the need to modify the education system using a practice-oriented approach in their research. The authors believe that the process of training a future specialist should meet the requirements of modernity, in connection with which an empirical study was conducted at the Voronezh Pedagogical University.

Scientists have developed a "practice-oriented model of training undergraduates" in accordance with criteria and indicators, including motivational, cognitive and activity. Such a model consisted of components, means of implementation and means of activity diagnostics. The results of its implementation in practice determined a low, medium or high level of professional competence formation [9].

This method of implementing a practice-oriented model E. Chernysheva, D. Dakhin and A. Brekhova [9] confirmed that the level of these indicators was much higher in the experimental group (an influence was created in the form of a practice-oriented model) than in the control group (there was no influence), which indicates a positive influence of the practical direction of training.

At the same time, the view of the Kazakh scientists is interesting for scientific work: G. Tashkeyeva et al [10]. The authors believe that developing countries face a problem in the field of education, the essence of which is an excess of specialists with higher education, but a shortage of qualified specialists with practice-oriented training. According to the scientists, there is a disproportion in the modern space where demand and supply do not correspond to the methods of vocational education and business trends in the labor market [10].

Thus, to solve the existing problems, the practice-oriented approach of training should be the integration of science, education and production with common goals. Since the world society considers the university

environment to be the source of new technologies, university education should be aimed at results, namely, possession of not theoretical materials, but the ability to act in various professional situations [10].

According to M. Romanova, O. Shashkina and E. Starchenko [11], the practice-oriented approach develops students' mental, practical and creative activity, in connection with which applicants for higher education master critical thinking and positive motivation for further activity.

Experimental studies justified the practical significance of the competence approach and the correctness of their views. Their essence was to develop exercises and implement them for students of philological specialties to model situations with intercultural communication [11].

One way or another, the practice-oriented education is a response to the requirements of employers and the requirements of modernity. Researchers claim that "the demand for applicants for higher education in the labor market is considered as a decisive indicator of the ability of the education system of a country to adapt to social and economic changes" [12].

As a confirmation of such a quote, it is appropriate to turn to clear examples of the implementation of practice-oriented training. H. Wu and Y. Chang [13] describe the features of the practice-oriented approach in the context of distance learning and suggest the introduction of a mobile cloud application as an informational didactic learning tool.

The authors say that the cloud is not only a carrier of information, but also an excellent means of analyzing and verifying the knowledge gained by both students and teachers. A similar electronic orientation of the didactic means of practice-oriented education can also be found in the research of S. Sattari et al [14].

Scientists propose the creation of a knowledge map for higher education based on the Internet. Such a map can correspond to modern types of learning, including nonlinear and discontinuous. At the same time, the

developed didactic model will provide traditional knowledge supported by a practical expert point of view [14]. In addition to these examples, it is worth mentioning the special practice of STEAM training described by P. Zharylgassova et al [15].

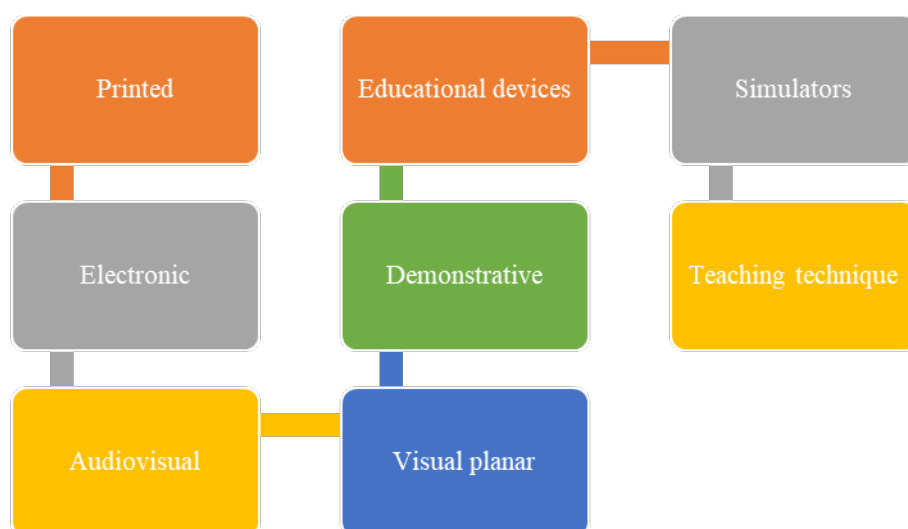
Scientists are considering an educational model consisting of combining five subjects, such as science, technology, engineering, art and mathematics, as well as their integration into an interdisciplinary plane. Kazakh researchers conducted an experiment in which 46 students took part [15]. The aim of the study was to determine the difference between students in the STEAM program and students in standard curricula.

As a result, it was found out that the average performance of students in the experimental group is much higher, which indicates the positive impact of practice-

oriented education. Thus, Kazakh scientists have shown that students can to develop psychological and pedagogical skills in the conditions of practice-oriented training [15].

As we can see, using the example of theoretical analysis of scientific works and empirical research, the introduction of practice-oriented training provides for the development of updated teaching tools, in particular information didactic ones. According to M.A. Kananyihina [16], didactic teaching tools are "material objects, carriers of educational information or natural objects that teachers use during pedagogical activity and applicants for higher education during educational activity".

In particular, the researcher defines the following classification of information didactic teaching tools (Figure 2):



For example, E. Belokoz [17] believes that didactic materials contribute to the formation and development of a socially valuable specialist in the process of mastering practice-oriented education based on independent work. The author claims that didactic materials during the educational process should be selected individually for each applicant for higher education, in accordance with the diagnosis of individual psychological qualities.

For their part, M. Mamontova, B. Starichenko and S. Novoselov [18] tend to believe that informational didactic materials are "a tool for ensuring pedagogical activity and educational activity of students", which is compared with the conviction of M. Kananyihina [16].

In this context, scientists propose to create electronic intellectual maps in the form of logical-semantic multidimensional models that can provide both a semantic designation and an analytical note of certain knowledge [18-21]. In addition, the authors insist on the synthesis of technologies in practice-oriented teaching, in particular on the formation of verbal and image models of the presentation of educational material, in accordance with the structure of each individual academic subject.

So, the analysis of the concepts of "practice-oriented education" and "information didactic means" allows us to consider the features of this educational campaign in the conditions of higher education in Kazakhstan, based on the

primary semantic context of the described concepts. Referring to the statistical data of the Ministry of Education of the Republic of Kazakhstan for 2021, over the past two years, about 600 new and approximately 100 innovative practice-oriented training programs have appeared in the field of education of the state. In particular, 20% of the programs are in the direction of "Pedagogical Sciences", 18% – "Business, management and law" [19; 22].

In addition, statistics of the Ministry of Education and Science of the Republic of Kazakhstan provides specific examples of innovative renewal. Thus, national and state higher educational institutions are focused on training professionals in the specialty "Cyber Pedagogy", "Artificial Intelligence technologies", "STEM education" and others [19; 23].

The Government explains such trends by the development of certain industries in the field of economic relations of the country, as well as by active processes of digitalization and informatization of society, which need to be compared with international standards [24-26]. At the same time, according to S. Mizanbekov et al. [20], the introduction of practice-oriented teaching of these social and humanitarian disciplines should provide for the use of multimedia tools that implement the didactic principle of visualization.

According to the authors, digital didactic teaching tools also implement a communicative orientation, form the variability of skills in using various communication channels, contribute to the assimilation of educational content, as well as the development of "the ability to transform visual informative material into a verbal sign system" [20].

Information technologies are especially important in conditions of quarantine and the inability to master practical skills using traditional teaching methods [27; 28]. However, according to G. Ismuratova et al. [21], e-learning is in a state of development in the Kazakh education system, since the existing systems are limited by technology and time, which prevents proper learning. Thus, the scientists propose to create individualized electronic educational didactic materials that will ensure the passage of synchronous and asynchronous training at the university, as well as visiting universities only in the case of introductory classes or exams. In addition, distance learning programs will be planned not only for free cells in the teachers' schedule, but also based on the work schedule of students who study and work simultaneously [21; 29-31].

In general, it is worth noting that the modern education system of the Republic of Kazakhstan is characterized by the introduction of a three-language model, which, accordingly, causes new requirements for the methodological foundations of education. For example, D. Kozhamzharova et al. [22] consider using the CLIL (Content Language Integrated Learning) case model at Taraz State Pedagogical University to teach future physics teachers in English. Thus, scientists are trying to combine practice-oriented education in the context of an interdisciplinary space. At the same time, researchers describe the development of a "Workbook" as one of the informational didactic tools for teaching physics in English [22].

A striking example of the renewal of didactic means of practice-oriented education is the activity of the South Kazakhstan State University. According to S. Zholdasbekova et al. [23], informational didactic materials should be formed under the system of technical and vocational training. At the university, special attention is paid to the continuous development of the student and his individual indicators, in connection with which, in the future, educational didactic material is selected [23; 32].

We consider the study of A. Kubekova [24] to be particularly important for scientific work. The scientist conducted a survey on satisfaction with practice-oriented training among students of economic specialties of Kostanay Higher Economic College of Kazpotreboysuz, thanks to which it was determined that 63.9% of students consider practice a step into the future, at the same time 20.8% of students consider practice an opportunity for further employment [24].

Thus, we see the need and prospects for practice-oriented education in universities of the Republic of Kazakhstan. Anyway, state higher educational institutions search new methodological foundations with already known results. Based on the analytical note of the Ministry of Education and Science of the Republic of Kazakhstan, 24 universities of the country implemented massive open online courses in 2019, developed their information

platforms for conducting courses using proper technical support [25; 33].

Thanks to high-quality training, compared to previous years, the number of students has increased significantly: about 9000 bachelors and 200 undergraduates [25]. In addition, a particularly important fact is that not only students of higher educational institutions of the Republic of Kazakhstan, but also representatives of other countries participated in the online course, which indicates a high level of preparation of information and didactic teaching tools [34-37].

However, state monitoring has shown that higher educational institutions of the Republic of Kazakhstan do not currently provide for various online training events using information resources of foreign educational platforms [25; 38].

So, the information obtained allows us to assert that Kazakh education is an extremely promising field of activity. Taking into account both positive and negative experience of the formation of the educational process based on the practice-oriented approach using innovative information didactic means, it is worth noting that the state of the Republic of Kazakhstan is trying in every possible way to improve the existing educational programs that meet the requirements of modern world society, the national labor market, and the wishes of the students themselves [39-42].

Such practices once again confirm the need for high-quality and innovative development of a theoretical basis for the introduction of modern teaching approaches, in particular practice-oriented. Statistics of the Ministry of Education and Science of the Republic of Kazakhstan show that current trends indicate qualitative changes, in particular in the intentions of state representatives to establish cooperation with international top teachers who can help regulate the learning process in the shortest possible time [25; 43].

Anyway, we believe that the current education system of the Republic of Kazakhstan needs a universal structural and functional didactic model to implement the practice-oriented education in higher national and state educational institutions, the theoretical foundations of which will be taken from previous scientific and methodological studies of both domestic and world scientists. This model can provide high-quality educational content with didactic teaching tools in the context of the global digital information space and provide opportunities for international online cooperation in the educational environment.

Conclusions

Thus, the problem was considered in the course of the scientific research to develop information didactic tools for the practice-oriented education in universities of the Republic of Kazakhstan. It is determined that modern educational trends are focused on the activity approach, and therefore there is a need for the development of the didactic basis of learning.

The existing studies of the selected problem in the context of the Kazakh and world space are considered. It is found out that the study of the features of the development of information didactic tools and the introduction of practice-oriented training requires a proper exhaustive

definitive analysis of these concepts. It is proved that "practice-oriented training" is generally understood as an integrative system of innovative educational methods aimed at improving the key components of a future specialist, in particular psychological, cognitive, activity and motivational. The views on the interpretation of the concept of "information didactic means" are analyzed, because of which a general interpretation was determined: material objects of the external environment that are used during the pedagogical and educational activities of the subjects of the educational process.

The author considers the main methods of improving the didactic material for the implementation of practice-oriented training, including the creation of "Workbooks", the development of a mobile cloud tool, the introduction of STEAM practice, the creation of individualized work programs.

Based on the analyzed scientific works and experimental studies, the features of practice-oriented education in universities of the Republic of Kazakhstan, as well as methods of developing information didactic tools for its implementation, are highlighted. Among the main

developments as didactic teaching tools in the context of the practice-oriented approach of the Kazakh education system, the CLIL case method, electronic multimedia tools, mass open online courses are identified.

Based on statistical data of the Ministry of Education and Science of the Republic of Kazakhstan, the prospects of education development and the introduction of a practical component in the process of forming a future specialist in a particular field are confirmed. Prospects for further research are being examined in the practical development of a structural didactic model for the implementation of practice-oriented education in universities of the Republic of Kazakhstan, as well as in the empirical verification of its effectiveness.

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Conflict of Interest

None.

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Розвиток інформаційних та дидактичних засобів для практико орієнтованої освіти в університетах

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Анотація

Актуальність. Актуальність дослідження визначається зміною освітнього середовища, що сприяє пошуку нових інноваційних методів навчання кваліфікованих фахівців, здатних вирішувати будь-які завдання у своїй професійній діяльності.

Мета. Метою статті є аналіз характеристик практико орієнтованої освіти в казахстанських вищих навчальних закладах у відповідності до розвитку інформаційних та дидактичних засобів..

Методологія. У роботі були використані загальнонаукові теоретичні методи, такі як порівняння, синтез, системний аналіз, систематизація, узагальнення та статистика, метод від абстрактного до конкретного на основі системних та структурно-функціональних підходів.

Результати. Автор проаналізував ряд наукових та методичних казахстанських та іноземних джерел для визначення семантичного компонента явищ "практико орієнтована освіта" та "інформаційні дидактичні засоби". Розглянуто поточний стан практико орієнтованої концепції навчання в університетах України, Росії та Австралії. Обґрунтовано інтерпретацію інформаційних та дидактичних засобів як матеріальних інструментів професійної взаємодії суб'єктів навчального процесу. Проаналізовано практико орієнтовану освіту в університетах Республіки Казахстан та визначено ключові інформаційні та дидактичні засоби, зокрема дуже відкриті онлайн-курси, методи кейсів "Робочий зошит", індивідуалізовані електронні навчальні програми. Підтверджено перспективний вектор розвитку практико орієнтованої освіти в казахстанських університетах на основі статистичних даних стану попередніх років.

Висновки. Стало очевидним, що сучасні освітні парадигми надають перевагу активності, що вимагає удосконалення педагогічних основ. Було проаналізовано різноманітні дослідження, як місцеві, так і міжнародні, для зрозуміння нюансів розвитку інформаційних навчальних засобів та інтеграції практичних методик навчання. Було встановлено, що комплексний аналіз цих концепцій є надзвичайно важливим. "Практико орієнтована освіта" виокремилася як цілісна система інноваційних навчальних методик, спрямованих на покращення основних аспектів розвитку студента, охоплюючи психологічні, когнітивні, мотиваційні аспекти.

Ключові слова: інноваційна освіта; дидактика; активний підхід; абітурієнти; навчальна практика; інформаційна та дидактична компетентність.