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Цифровые инструменты современного менеджера: анализ проблем и возможностей инженерно-экономического образования

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Аннотация. Сегодня автоматизация неизбежно сопутствует общественно-экономическому развитию. Этот процесс сопровождается появлением необходимых инструментов, способствующих его реализации. Диффузия этого явления во все сферы практики, в том числе и в управление, динамична. Менеджмент сталкивается с ростом потребности в применении цифровых инструментов. Следовательно, перед образованием встает проблема формирования у будущих руководителей соответствующих меняющимся условиям компетенций. Новые знания, умения и навыки должны быть сформированы не только у специалистов сферы информационно-коммуникационных технологий, но и у будущих менеджеров. При решении этого вопроса необходимо слаженное взаимодействие студентов, педагогов, администраций вузов, производства и рынка. Учащимся инженерно-экономических специальностей важно осваивать как информационно-поисковые методы, так и системно-алгоритмический инструментарий. Более того, появляется необходимость в овладении конкретными языками программирования. В представленном в статье исследовании его результатами подтверждается предположение о том, что менеджеры нового поколения вполне осознанно представляют необходимость овладения компетенциями в сфере информационных технологий. Также результаты анализа указывают на то, что многие респонденты уже имеют определенные знания в этой области и индивидуальный опыт, проверенный собственной практикой применения специфических информационно-коммуникационных методик. Опрос экспертов и студентов позволил выявить ряд «цифровых» компетенций, то есть комплекс знаний, умений и навыков, необходимых будущим менеджерам при решении типично управленческих задач. В статье поднимается проблема соотношения формирующихся в социуме потребностей с образовательным содержанием и структурой учебной среды вуза, соответствия учебных программ инженерно-экономического образования требованиям времени.

Ключевые слова: инженерно-экономическое образование; цифровые компетенции; информационные технологии; управленческий вуз; будущие менеджеры; интеграция; промышленность; производство

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Original article

Digital tools of a modern manager: analysis of problems and opportunities of engineering and economic education

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Abstract. Today, automation inevitably accompanies social and economic development. This process is accompanied by the emergence of the necessary tools to facilitate its implementation. The diffusion of this phenomenon into all areas of practice, including management, is dynamic. Management is facing a growing need for digital tools. Consequently, education faces the problem of developing competencies in future leaders corresponding to changing conditions. New knowledge, skills and abilities should be formed not only among specialists in the field of information and communication technologies, but also among future managers. When solving this issue, it is necessary to coordinate

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the interaction of students, teachers, university administrations, production and the market. It is important for students of engineering and economic specialties to master both information retrieval methods and system-algorithmic tools. Moreover, there is a need to master specific programming languages. In the study presented in the article, its results confirm the assumption that the managers of the new generation quite consciously represent the need to master competencies in the field of information technology. Also, the results of the analysis indicate that many respondents already have certain knowledge in this area and individual experience, verified by their own practice of applying specific information and communication techniques. A survey of experts and students made it possible to identify a number of «digital» competencies, that is, a set of knowledge, skills and abilities that future managers need when solving typical managerial tasks. The article raises the problem of correlating the needs emerging in society with the educational content and structure of the educational environment of the university, and the compliance of engineering and economic education curricula with the requirements of the time.

Key words: engineering and economic education; digital competencies; information technology; management university; future managers; integration; industry; production

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Introduction

Digital technologies today mediate not only communication, but also many types of social, cultural, educational, industrial, individual activities and human life. Thus, computing, information and communication, multimedia technologies become full-fledged, using the term L. S. Vygotsky, «cultural-historical tools» that expand human capabilities [Rozin, 2020]

Simultaneously with this trend, we observe another one: education in many cases comes to the forefront of digitalization and acts as a platform for introducing the latest technologies. Digital coverage of various forms, types and stages of educational activities is becoming comprehensive and irreversible. Learning content acquires more than just visual, auditory, kinesthetic and digital resolution. It is structured differently [Gianelli, 2018]. In particular, more emphasis is placed not on the transmission of information through the visual and auditory analyzers of students, but on the transmission of thinking techniques in the «here and now» mode [Romanova, 2020; Rudskoy, 2018].

Science and practice put forward a number of acute problems discussed by information engineers, educators, and psychologists. How are the cognitive abilities and capabilities of today's students changing? Do the latest information technologies create benefits for students, or do the abundance of visuals, hypertextual presentation, redundancy of content, spontaneity in the choice of material reduce the abilities of subjects of knowledge [Baskakova, Soboleva, 2019]? How does the emergence of fundamentally new ways of producing and reproducing knowledge, types of thinking and communication, hybrid and artificial intelligence, and automation of life processes affect the intellectual and emotional spheres of a person

[Gianelli, 2018]? How is the motivational structure of students transformed under the influence of new technologies [Ardabatskaya, 2021; Karpushova, 2019; Obuhova, 2023]?

These questions, plus the authors' observations and analysis of the social and educational activity of students at the State University of Management, as well as the desire to look at the problem from the perspective of «management university-industry-science-market», directed research attention to confirming or refuting the following hypothesis: students of management specialties, that is, future managers, are quite definitely aware of the need to master the competencies in the field of information technology for successful professional activity and self-realization in market conditions.

Working with this hypothesis, in our opinion, involves answers to the following research questions:

1) What are the ideas of the expert community about the structure and composition of the competencies of a modern manager in the context of the digitalization of the economy?

2) What are the changes in modern requests of employers in relation to applicants for managerial vacancies?

3) What is the awareness of future managers of the need to develop digital competencies for the sustainable development of the economy?

Research methods

In the study conducted by the authors, several methods were successively applied: an individual expert survey in the form of an unstructured interview, an analysis of expert assessments, a structured interview, and a survey using a questionnaire developed by the authors.

At the beginning of the work, an expert group was formed, which included: 1) a leading software devel-

oper for an IT company; 2) head of the HR department of the company; 3) head of the compensation and benefits department of the company; 4) head of the HR department of the company; 5) general director of an industrial enterprise; 6) Deputy IT Director of a fuel and energy company; 7) an auditor of a consulting company; 8) head of the procurement department of an aircraft manufacturing company; 9) Professor of the Institute of Information Systems of the State University of Management; 10) three associate professors of the management department of the State University of Management. The requirements for the members of the expert group were as follows: at least 5-8 years of work in the field of IT, in the real sector of the economy, or in higher education. In fact, 12 representatives of the «university-industry-science-market» sphere took part in our study.

Expert interviews were conducted in two stages. At the first stage, the interview was unstructured and contained an invitation to the respondents to think aloud in the following directions: 1) What additional competencies do they think future managers will need in the digital economy? 2) What types of information technologies are necessary for managers now and require development in the near future? 3) How have the demands of employers changed in relation to applicants for managerial vacancies?

After processing the detailed answers of the experts in the given areas, the authors selected seven main types of information technologies that the experts consider promising and necessary for further consideration. Further, according to the selected types of information technologies, a structured interview program was compiled and, in accordance with it, the survey of experts continued. The structured interview included questions about specific information tools included in the seven selected types of IT. According to the authors, information technologies, being mastered, will allow future managers to form the competencies necessary in the digital economy.

The types of information technologies identified by experts in the course of unstructured interviews and applied at further stages of the study include:

- programming languages;
- database;
- corporate IT systems;
- data analysis tools;
- marketing tools for promotion through social networks;
- complex means of search, analysis, forecast;
- machine learning tools.

In the process of subsequent interviews, the experts named sets of specific tools associated with each selected type of information technology.

The final stage of collecting information was a survey of students of management specialties of the State University of Management in order to identify their conscious need to study and apply specific information technologies. The questionnaire included seven types of information technology, specific tools within each type, and an additional line called «Other», allowing respondents to indicate those types and tools that were not included in the questionnaire.

Research results

The results of the expert survey and interviews.

Representatives of the expert group during individual interviews noted the following.

Digital skills not only enable the production and sharing of content, they create opportunities for enterprise, communication, operation and sustainability challenges. The accumulation of a «critical mass» of employees with developed digital competencies creates a competitive advantage for their organizations. Through the use of technology platforms, the company's cost structure becomes more efficient. The high quality of products and services, determined by high-tech solutions, ensures the inflow of investments.

In modern organizations, a number of situations require managers to predictively see the possibilities that digital technologies can provide:

- introduction of electronic document management;
- partial or full automation of business processes;
- implementation of corporate IT systems;
- development of the KPI system in the organization;
- all types of planning;
- formation of quality systems;
- development of the organization's business model;
- preparation of changes that provide competitive advantages.

Another phenomenon was mentioned by six out of ten experts. A modern manager is forced to constantly and closely interact with such specialists as: a front-end developer (creates websites and web applications), a web developer (a front-end developer with knowledge of the backend), a back-end developer (works on websites and applications, is responsible for internal part of the project hidden from the user's eyes), data analyst (collects, analyzes, visualizes data and helps make decisions), data engineer (creates an infrastructure so that data is stored and processed sta-

bly, and then gets into analytical systems without failures), machine training (trains models to predict user behavior and predict the reaction of complex systems to changes), neural network specialist (creates and trains neural networks to solve applied problems), interface designer (designs the appearance of sites, makes them convenient and beautiful), product manager (responsible for the creation and development of digital products, knows what, why and how to do it in order to solve the problems of users and business).

Such communication undoubtedly requires high-quality engineering training of the manager and knowledge of information technologies. Publications also testify to this [Alieva, 2022; Baiborodova, 2021; Blinov, 2020; Merenkov, 2021].

As for employers' requests for digital competencies that are additional to managerial competencies, experts agree that managerial competencies are evolving at a gigantic pace. It is impossible to imagine a «new type of manager» without advanced professional knowledge, skills and abilities from the field of IT. The manager already now needs experience in independent planning and implementation of IT solutions, software architecture design (at least for the competent setting of tasks for information specialists); compiling a catalog of information services necessary for the functioning of production processes [Danilaev, 2021; Koloskova, 2022; Luksha, 2021]. The head must, together with IT deputies and other specialists, form the information technology strategy of the enterprise; design information protection to ensure the economic security of the organization, create a quality system. He must be aware of the possibilities and features of promoting goods and services on the Internet. He simply must be confident in the operation of ERP systems, blockchain, business intelligence, the Internet of things (IoT), Big Data. Our expert opinions are also supported by research [Bryanskaya, 2021; Vikhareva, 2022; Gromov, 2023].

Survey using the developed questionnaire.

In the course of the study, 184 students of the State University of Management studying in the direction of «Management» were interviewed in 11 groups. The answers were differentiated in different columns of the questionnaire, which made it possible to single out both the tools and types of information technologies already used by students, and those only supposed to be used in the future.

In the process of processing, the results of the students' choice of the types of information technologies necessary, from their point of view, for studying were obtained.

During the survey, responses to the line «Other» were received in only six questionnaires. Moreover, four times of them were mentioned «Adobe» — the package as a whole or «Photoshop» separately. In two other cases, knowledge of foreign languages and legal disciplines that were not at all related to IT were named. Based on this, the following tables and diagrams show only the seven main types of information technology contained in the questionnaire.

As a result of processing the survey results, the largest number of choices was received for the 1st type of IT – programming languages, in second place is the 4th type – various data analysis tools, in the third place is the 3rd type – corporate IT systems, in fourth place is the 2nd type – databases, on the fifth – marketing tools for promoting the product in social networks.

In the context of student groups, the results are almost the same – only in one group, the 1st and 4th species changed places.

Analysis of the obtained results allowed us to draw the following conclusions. Students' ideas about the types of information technologies necessary for studying have a common structure: the most popular at the moment are: programming languages, various data analysis tools, corporate IT systems, databases and marketing tools for promoting a product on the Internet.

It should be noted that the types already used are a smaller part than those intended for future use. Students are more likely to choose the option «I assume I will need these technologies in my activities.» That is, students are aware of not only a momentary need, but also a trend towards further digitalization and the need to master digital competencies.

Thus, all the “digital” knowledge, skills and abilities identified in the course of the study, which are necessary for managers of the future, in addition to typically managerial ones, can be formulated in a generalized form in the form of competencies:

- extended computer literacy, including not only information search, data filtering, but also knowledge of programming languages;
- application of digital tools for data analysis, including various operations with databases;
- solving various tasks of automating management processes using digital marketing tools and corporate systems;
- integration of digital content;
- communication and interaction using the full range of digital solutions;
- data protection, confidentiality, cyber security;
- creative use of various digital tools.

Discussion

The hypothesis of the study, which consists in the fact that future managers are quite definitely aware of the need to master competencies in the field of information technology, is confirmed by the results obtained.

Awareness of this need is extremely important for the sustainable development of the economy, since digital transformation is becoming a critical factor for the development of industry [Moiseeva, 2022; Solozhentsev, 2018]. And this is not just the popularization of information and communication technologies in business through education. The digital competence of managers and all employees of industrial companies provides a competitive advantage for the business. Knowledge, skills and abilities in the field of using digital devices, networks for accessing information, communication applications allow you to competently use digital content, manage it, and implement it in your professional activities.

In our opinion, consistent integration of new competencies into modern educational practices is necessary. Moreover, integration should affect all learning formats, both full-time and distance learning, and serve the learning process throughout life. In the conditions of the need to master information technologies, which is realized by both experts and students – future managers, in the professional environment there is a discussion and understanding of this issue, and the search for specific opportunities for the formation of the required competencies.

Conclusion

Thus, the study, deployed in the plane of «managerial university-industry-science-market», showed that at the present time, the awareness of the need for the formation of competencies in the field of information technology by future managers is changing significantly and the need for them has already been formed. That is, in the conditions of the digital economy, there is a need to master new competencies of managerial activity. This situation should meet the educational content and structure of the learning environment at the university.

The simplified, entertaining behavior of Internet users is being replaced by thoughtful strategies aimed at enriching educational and professional tools [Sundukova, 2017].

It is impossible not to notice another very important feature of modern education for us: the initiator and main innovator is the youth. This is manifested not only in the natural desire of young people for novelty, but also in the organic introduction of

crowdsourcing interaction into education, when the «production» of an idea, content, service, product involves informal assistance and interest in each other of all members of the group. Increasingly, prosumerism is encountered in the university, that is, not only consumption, but also independent joint production of educational products. The creation of non-commercial collective products and services is based on partnership and the principle of transferring information and knowledge not from one source, but “from all to all”. As a result, new opportunities for the integration of education, science and industry arise and, moreover, should be consciously created to solve emerging problems and, as a result, to ensure the sustainable development of the economy as a whole.

Библиографический список

1. Алиева Б. Ш. Гуманитарное образование – ресурс развития человеческого капитала в условиях цифровой трансформации / Б. Ш. Алиева, М. Х. Рабаданов // Высшее образование сегодня. 2022. № 9. С. 2–7. DOI 10.18137/RNU.HET.22.09. P. 002.
2. Ардабацкая И. А. Социализация обучающихся школы средствами интеграции формального и неформального образования // Ярославский педагогический вестник. 2021. 4(121). С. 8–18. DOI 10.20323/1813-145X-2021-4-121-8-18.
3. Байбородова Л. В. Модели допрофессиональной педагогической подготовки обучающихся / Л. В. Байбородова, В. В. Белкина // Ярославский педагогический вестник. 2021. 6(123). С. 69–80. DOI 10.20323/1813-145X-2021-6-123-69-80.
4. Баскакова М. Е. Новые грани функциональной неграмотности в условиях цифровой экономики / М. Е. Баскакова, И. В. Соболева // Вопросы образования. Москва. 2019. № 1. С. 244–263. DOI 10.17323/1814-9545-2019-1-244-263.
5. Блинов В. И. Веер возможностей: профессиональное образование 2020–2035 / В. И. Блинов, И. С. Сергеев // Образовательная политика. 2020. № 1(81). С. 76–87. DOI 10.22394/2078-838X-2020-1-76-86.
6. Брянская О. Л. Модели обучения, применяемые в современной мировой практике высших учебных заведений // Педагогические науки. 2021. № 5(111). С. 13–17.
7. Вихарева Н. А. Преподаватель и его цифровые компетенции / Н. А. Вихарева, А. С. Попова // Актуальные вопросы образования. 2022. № 3. С. 3–6.
8. Громов Б. Ю. Концептуальная метафора понятия «компетенция» в теории образования // Ярославский педагогический вестник. 2023. № 1 (130). С. 29–38. DOI 10.20323/1813_145X_2023_1_130_29_38.
9. Данилаев Д. П. Кадровое обеспечение системы технологического образования молодежи: проблемы и пути решения / Д. П. Данилаев, Н. Н. Маливанов // Высшее образование в России. 2021. Т. 30. № 1. С. 60–72. DOI 10.31992/0869-3617-2021-30-1-60-72.

10. Джанелли М. Электронное обучение в теории, практике и исследованиях (пер. с англ.) // Вопросы образования. 2018. № 4. С. 81–98. DOI 10.17323/1814-9545-2018-4-81-98.
11. Карпушова С. Е. Формирование мотивирующей интерактивной среды развития технологических компетентностей // Актуальные вопросы профессионального образования. 2019. № 3(16). С. 38–42.
12. Колоскова Г. А. Формирование компетентности современного педагога в области использования веб-технологий // Вопросы методики преподавания в вузе. 2022. Т. 11. № 1. С. 25–32. DOI 10.57769/2227-8591.11.1.02.
13. Лукша П. О. «Нам нужен следующий переход – к человеку экосистемному». Разговор об образовании будущего / П. О. Лукша, М. Э. Кушнир, Л. Чекалова // Образовательная политика. 2021. 2(86). С. 16–24. DOI 10.22394/2078-838X-2021-2-16-24.
14. Меренков А. В. Практики организации подготовки инженерных кадров, востребованных индустрий 4.0 / А. В. Меренков, О. Я. Мельникова // Инженерное образование. 2021. № 29. С. 23–33. DOI 10.54835/18102883_2021_29_2.
15. Моисеева Ю. А. Проблема взаимосвязи структурных компонентов профессиональной компетентности и педагогической деятельности в процессе подготовки студентов // Ярославский педагогический вестник. 2022. № 5(128). С. 105–112. DOI 10.20323/1813-145X-2022-5-128-105-112.
16. Обухова Л. А. Педагогическая поддержка профессионального самоопределения обучающихся / Л. А. Обухова, О. А. Попова // Вестник Тверского государственного университета. Серия: Педагогика и психология. 2023. № 1(62). С. 145–152. DOI 10.26456/vtspyped/2023.1.145.
17. Розин В. М. Рефлексия оснований междисциплинарного изучения социальности // Вопросы философии. 2020. № 1. С. 64–73. DOI 10.21146/0042-8744-2020-1-64-73.
18. Романова И. Н. Непрерывное образование при подготовке инженерных кадров // Инженерное образование. 2020. № 28. С. 7–10.
19. Рудской А. И. Общепрофессиональные компетенции современного российского инженера / А. И. Рудской, А. И. Боровков, П. И. Романов, О. В. Колосова // Высшее образование в России. 2018. Т. 27. № 2. С. 5–18.
20. Соложенцев Е. Д. Эфемерное и цифровое управление безопасностью и качеством в экономике // Проблемы анализа риска. 2018. Т. 15. № 5. С. 76–95. DOI 10.32686/1812-5220-2018-15-5-76-95.
21. Сундукова Г. М. Инновационный подход к управлению интеллектуальным капиталом вуза // Управление. 2017. Т. 5. № 1. С. 80–87. DOI 10.12737/24705.
- transformacii = Humanitarian education is a resource for development of human capital in digital transformation / B. Sh. Alieva, M. H. Rabadanov // Vysshee obrazovanie segodnja. 2022. № 9. S. 2–7. DOI 10.18137/RNU.HET.22.09. P. 002.
2. Ardabackaja I. A. Socializacija obuchajushhihsja shkoly sredstvami integracii formal'nogo i neformal'nogo obrazovanija = Socialization of school students by means of integration of formal and informal education // Jaroslavskij pedagogicheskij vestnik. 2021. 4(121). S. 8–18. DOI 10.20323/1813-145X-2021-4-121-8-18.
3. Bajborodova L. V. Modeli doprofessional'noj pedagogicheskoj podgotovki obuchajushhihsja = Models of pre-professional pedagogical training of students / L. V. Bajborodova, V. V. Belkina // Jaroslavskij pedagogicheskij vestnik. 2021. 6(123). S. 69–80. DOI 10.20323/1813-145X-2021-6-123-69-80.
4. Baskakova M. E. Novye grani funkcional'noj negramotnosti v uslovijah cifrovoj jekonomiki = New facets of functional illiteracy in the digital economy / M. E. Baskakova, I. V. Soboleva // Voprosy obrazovanija. Moskva. 2019. № 1. S. 244–263. DOI 10.17323/1814-9545-2019-1-244-263.
5. Blinov V. I. Veer vozmozhnostej: professional'noe obrazovanie 2020–2035 = Fan of opportunity: vocational education 2020–2035 / V. I. Blinov, I. S. Sergeev // Obrazovatel'naja politika. 2020. № 1(81). S. 76–87. DOI 10.22394/2078-838X-2020-1-76-86.
6. Brjanskaja O. L. Modeli obuchenija, primenjaemye v sovremennoj mirovoj praktike vysshih uchebnyh zavedenij = Training models used in modern world practice of higher educational institutions // Pedagogicheskie nauki. 2021. № 5(111). S. 13–17.
7. Vihareva N. A. Prepodavatel' i ego cifrovye kompetencii = Teacher and his digital competencies / N. A. Vihareva, A. S. Popova // Aktual'nye voprosy obrazovanija. 2022. № 3. S. 3–6.
8. Gromov B. Ju. Konceptual'naja metafora ponjatija «kompetencija» v teorii obrazovanija = Conceptual metaphor for the concept of «competence» in the theory of education // Jaroslavskij pedagogicheskij vestnik. 2023. № 1 (130). S. 29–38. DOI 10.20323/1813_145X_2023_1_130_29_38.
9. Danilaev D. P. Kadrovoe obespechenie sistemy tehnologicheskogo obrazovanija molodjozhi: problemy i puti reshenija = Personnel support of the system of technological education of youth: problems and solutions / D. P. Danilaev, N. N. Malivanov // Vysshee obrazovanie v Rossii. 2021. Т. 30. № 1. S. 60–72. DOI 10.31992/0869-3617-2021-30-1-60-72.
10. Dzhanelli M. Jelektronnoe obuchenie v teorii, praktike i issledovanijah = E-learning in theory, practice and research (per. s angl.) // Voprosy obrazovanija. 2018. № 4. S. 81–98. DOI 10.17323/1814-9545-2018-4-81-98.
11. Karpushova S. E. Formirovanie motivirujushhej interaktivnoj sredy razvitija tehnologicheskikh kompetentnostej = Formation of motivating interactive environment for development of technological competencies // Ak-

Reference list

1. Alieva B. Sh. Gumanitarnoe obrazovanie – resurs razvitija chelovecheskogo kapitala v uslovijah cifrovoj

tual'nye voprosy professional'nogo obrazovaniya. 2019. № 3(16). S. 38–42.

12. Koloskova G. A. Formirovanie kompetentnosti sovremennogo pedagoga v oblasti ispol'zovaniya veb-tehnologij = Building the competence of a modern teacher in the field of using web technologies // Voprosy metodiki prepodavaniya v vuze. 2022. T. 11. № 1. S. 25–32. DOI 10.57769/2227-8591.11.1.02.

13. Luksha P. O. «Nam nuzhen sledujushhij perehod – k cheloveku jekosistemnomu». Razgovor ob obrazovanii budushhego = «We need the next transition – to an ecosystem person». Talking about the education of the future / P. O. Luksha, M. Je. Kushnir, L. Chekalova // Obrazovatel'naja politika. 2021. 2(86). S. 16–24. DOI 10.22394/2078-838X-2021-2-16-24.

14. Merenkov A. V. Praktiki organizacii podgotovki inzhenernyh kadrov, vostrebovannyh industrij 4.0 = Practices for organizing training of engineering personnel, demanded industries 4.0 / A. V. Merenkov, O. Ja. Mel'nikova // Inzhenernoe obrazovanie. 2021. № 29. S. 23–33. DOI 10.54835/18102883_2021_29_2.

15. Moiseeva Ju. A. Problema vzaimosvjazi strukturnyh komponentov professional'noj kompetentnosti i pedagogicheskoj dejatel'nosti v processe podgotovki studentov = The problem of interrelation of the structural components of professional competence and pedagogical activities in the process of training students // Jaroslavskij pedagogicheskij vestnik. 2022. № 5(128). S. 105–112. DOI 10.20323/1813-145X-2022-5-128-105-112.

16. Obuhova L. A. Pedagogicheskaja podderzhka professional'nogo samoopredelenija obuchajushhihsja =

Pedagogical support for professional self-determination of students / L. A. Obuhova, O. A. Popova // Vestnik Tverskogo gosudarstvennogo universiteta. Serija: Pedagogika i psihologija. 2023. № 1(62). S. 145–152. DOI 10.26456/vtspyped/2023.1.145.

17. Rozin V. M. Refleksija osnovanij mezhdisciplinarnogo izuchenija social'nosti = Reflection of the foundations of interdisciplinary study of sociality // Voprosy filosofii. 2020. № 1. S. 64–73. DOI 10.21146/0042-8744-2020-1-64-73.

18. Romanova I. N. Nepreryvnoe obrazovanie pri podgotovke inzhenernyh kadrov = Continuing education in the training of engineering personnel // Inzhenernoe obrazovanie. 2020. № 28. S. 7–10.

19. Rudskoj A. I. Obshheprofessional'nye kompetencii sovremennogo rossijskogo inzhenera = General professional competencies of the modern Russian engineer / A. I. Rudskoj, A. I. Borovkov, P. I. Romanov, O. V. Kolosova // Vysshee obrazovanie v Rossii. 2018. T. 27. № 2. S. 5–18.

20. Solozhencev E. D. Jefemernoe i cifrovoe upravlenie bezopasnost'ju i kachestvom v jekonomike = Ephemeral and digital safety and quality management in economy // Problemy analiza riska. 2018. T. 15. № 5. S. 76–95. DOI 10.32686/1812-5220-2018-15-5-76-95.

21. Sundukova G. M. Innovacionnyj podhod k upravleniju intellektual'nym kapitalom vuza = Innovative approach to managing the intellectual capital of the university // Upravlenie. 2017. T. 5. № 1. S. 80–87. DOI 10.12737/24705

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