

ORGANIZATIONAL MANAGEMENT CHANGE IN HEIs: PERCEPTIONS OF ACADEMIC STAFF

*Jevgenija Dehtjare*¹, *Kristine Uzule*², *Larisa Turuševa*³, *Julija Mironova*⁴, *Liudmyla Hanushchak-Yefimenko*⁵

¹ Dr. oec., EKA University of Applied Sciences, Pernavas 62-301, Riga, Latvia, E-mail address: jevgenija.dehtjare@eka.edu.lv

² PhD, EKA University of Applied Sciences, Pernavas 62-301, Riga, Latvia, E-mail address: kristine.uzule@eka.edu.lv

³ PhD. Dr., paed., EKA University of Applied Sciences, Pernavas 62-301, Riga, Latvia, E-mail address: larisa.turuseva@eka.edu.lv

⁴ Mg., EKA University of Applied Sciences, Pernavas 62-301, Riga, Latvia, E-mail address: E-mail address: mironovai.julijai@gmail.com

⁵ Dr. Oec., Kyiv National University of Technologies and Design, Mala Shyianovska Str 2. Kyiv, Ukraine, E-mail address: glm5@ukr.net

Received 06 02 2024; Accepted 07 02 2024

Abstract

The relevance of the research is ensured by the need to increase business and academic effectiveness in line with Sustainable Development Goal 8, which includes aspects of productive employment for all, higher education institutions should introduce new forms of running organisational management operations.

The problem of the research lies in rising need in changing organisational management approach in HEIs, however the perception of the academic staff must be heard and survey results applied.

The purpose of this research was to identify the perceptions of academic staff on pending higher education transformation to yield recommendations for organizational management changes in higher education.

The research methods - quantitative research design was used to collect data in a survey of academic staff.

The main results of this pilot study reveal the necessity to adapt existing academic staff competences to the changing needs of organisational management process modernization in the higher education.

Keywords: *competencies, education management, higher education institutions, sustainable development.*

JEL Codes: *I23, J24, M10.*

Introduction

The goal of this research was to identify the perception of academic staff related to imminent transformation of higher education (HE) and find out the needs of academic staff in pertinence to such transformation. Ukraine is a country experiencing global transformations in all sectors related to current war situation, including in the education sector. After the end of hostilities, Ukraine will have to significantly restructure its approach to the global economy, emphasizing a simplified management style, the introduction of modern communication methods, and the use of a digital environment. Higher education in Ukraine should in many ways become the starting point for sustainable

changes. Thus, the purpose of the study was to identify the current perception of academic staff on pending higher education transformation to yield recommendations for organizational management changes in higher education. The research methodology included a survey of academic staff working in Ukraine, precisely because these people are at the epicentre of the coming transformations. Quantitative research design was used to collect data in a survey of 45 members of academic staff working in higher education institutions in Ukraine in the period of May 2022 to February 2023. The research unit was selected by the following criteria: all the participants were representatives

of both state and private higher education institutions in Ukraine with at least 10 years of teaching experience, interested in increasing their professional competence by attending international internships (and a survey was a part of such an internship) and representing wide scope of scientific areas. Such a long period of teaching experience was related to the necessity to evaluate a retrospective of changes in an area of higher education and ability to determine the need for changes in organizational management, taking into account the historical perspectives and trends. A quantitative study with only 45 participants was chosen due to the following facts: as already mentioned, certain continuous working experience was requested; the survey was made both during COVID-19 and the present war, so the connection possibilities were limited; the survey was a pilot phase and later on it was expanded in other countries, such as Latvia, Lithuania, Kazakhstan, and others, and wider research is planned to continue the studies on organizational management change in HEIs.

Scientific ethics principles were applied in the research, such as the following: the researchers obtained voluntary and informed consent from participants before inviting them to fill out a survey form online. This included the provision of clear information about the study's purpose and procedures and ensuring participants understand their rights and opportunity to freely choose whether to participate. The confidentiality of the participant's personal information was ensured as well.

The originality of this study is confirmed by the findings of other studies, such as Rieg (2021), who stated higher education institutions are urged to integrate sustainability across all their structural and organisational dimensions, or Faller and Marsick (2023), who persisted the organizational management change always catalyses members to challenge, reframe and revisit the assumptions that preside over the work they do.

The object of the research is higher education, in Ukraine in particular. The subject of the research is the way academic staff perceives the need in transformation of the organisational management process in the HE.

The originality of the research is the analysis of the academic staff of Ukraine on their vision of imminent transformation of HE in Ukraine. The benefits of the research relate to identification of educators' needs to successfully carry on their duties through transformation of organisation management process in HE. The findings of the research will reveal the problem in agile transformation of teaching approaches and academic staff competencies to the changing needs of organisation management of the higher education institutions (HEIs), thus improving the competitiveness of HEIs with lifelong learning educators. The implications of the research are applied. Specifically, the results of this pilot study can be used by managers of HEIs to enhance the quality of organization management processes.

One approach to management transformation in HE might be grounded in the concepts of sustainable development (henceforth – SD) that are summarized in sustainable development goals (henceforth – SDGs). As any transformation, SDGs inclusion requires investment and re-allocation of resources, and reconsideration of business and academic models, all of which are associated with various types of risks that might hinder the immediate development of HEIs. Thus, HEIs should introduce new forms of running academic and administrative operations, e.g., by implementing modern teaching approaches, SDGs and design thinking approach. The staff should develop their 21st century skills, which are the skills that help handle the increasing sophistication of automatization processes (Rivas *et al.*, 2023) across different disciplines. The development of these skills is associated not only with skill implementation discipline-related capability, but also with changes in the overall thinking patterns (Teo *et al.*, 2021). Transformation of HEIs is additionally constrained by social and labour needs of both local and global markets, as well as global megatrends of internationalization and interculturalisation (Karkkainen *et al.*, 2023).

World Economic Forum notes that “education reform requires looking at the root cause of problems: at what is being taught (curriculum), how (pedagogy), when and where (technology and the real world) and

whom we are teaching (access and inclusion). Those institutions which are ready to address these fundamental issues will succeed in truly transforming higher education” (El-Azar, 2022), also starting making some changes:

- online learning, which allows students to study from everywhere;
- teachers’ lectures should stay in the past, using modern means which lead to active learning;
- soft skills which are highly appreciated by employers.

Some potential ways of transforming higher education are:

- open educational resources democratize course content access and potentially lower instructional costs;
- flexibility in learning environments and accountability to diverse learning styles;
- competency-based modular educational system (Brown, 2018).

According to El-Azar, although there are some changes in HE which seem necessary and timely, “universities continue to focus on teaching specific skills involving the latest technologies, even though these skills and the technologies that support them are bound to become obsolete. As a result, universities are forever playing catch up with the skills needed in the future workplace” (El-Azar, 2022). Universities should teach students the skills which they will be able to use in the future in unknown contexts. Very popular and highly demanded nowadays is the so-called interdisciplinary approach.

Though students’ motivation has been widely discussed in scientific articles, more and more attention is being paid to academic staff’s motivation, as motivation encourages them to take more ambitious steps, to involve in research and creative work more willingly. The motivational factors mentioned by the academic staff surveyed by Stachowska and Czaplicka-Kozłowska (2020), are:

1. Remuneration, stability and safety of employment.
2. Flexible working hours, the relationship at work, greater autonomy.

In addition, financing professional development, are highly appreciated by the academic staff (Stachowska, Czaplicka-Kozłowska, 2020).

The study in Czech Republic (as well as previously in other countries) also shows that money is one of, but not the main element of motivation. For the employees it is important to understand the strategy of the organisation, have good working conditions (Štemberkova *et al.*, 2019).

Though education process digitalisation helps in many cases improve the modern learning environment and makes HE available for a bigger number of learners, “technology alone cannot be the answer to address all of the challenges that face colleges and universities. Online courses, and self-directed and asynchronous learning may not be the best for everyone” (Brown, 2018).

According to Brown, “When it comes to higher education's problems, technology alone is not the solution, but it is a necessary part of the equation” (Brown, 2018, p. 310). He also suggests that “the ideal for higher education lies somewhere in-between the purely digital and purely traditional modes of educational delivery” (Brown, 2018, p. 308). Unfortunately, blending education can lead to the illusion of an undergoing reform. Though, looking deeper, digitalization is just a new, modern mode of delivering information.

As the survey represented data obtained from the Ukrainian HE sector, the educational achievement of both, Ukrainian and EU, should be compared. According to CEDEFOP, the skills of the Ukrainian group are lower. In terms of specific subjects, the results in Ukraine are similar to those in Greece, Malta, Slovakia, Croatia, Luxembourg, and Italy (CEDEFOP, 2022). The lower scores achieved by Ukrainian students can be partly attributed to their lower socioeconomic background. They lack basic skills in reading, mathematics, and science. However, when considering student ambition, Ukrainian students display a strong desire to pursue higher education degrees, surpassing the average aspirations of EU students. This

indicates a notable level of ambition among Ukrainian students.

To sum up existing situation of HE in Ukraine, it should be mentioned that as of 25 October 2022, there are 525 public tertiary institutions and 162 private ones, for a total of 687 institutions. Most of them, despite the Russian invasion, provide their services exclusively online or opt for a hybrid format. In the vast majority of tertiary institutions, nearly all students (81-100%) or more than half of students (51-80%) resumed their studies after 24 February 2022. Only in 26 tertiary institutions less than 50% of the students continued their education. While the great majority of students intend to continue their studies, 23,223 students (which corresponds to 2% of the respondent institutions' student population) already had to drop out for various reasons. Conversely, 1,825 academic staff, or 1.4% of tertiary education's employees, were unable to continue teaching and research duties after 24 February 2022 (Humanitarian Response, 2022).

The role of ICT in management was discussed by a group of authors (Gavkalova *et al.*, 2022), who noted that the administration is based on new forms of electronic communication, which has led to increasing the volume of information. Digitalisation influences the level and quality of communication, increasing the amount of information the teachers work with, critically evaluating it and choosing the most proper way of delivering this information to students. What resources, at what amount and in what way should be acquired by students, depends on the teacher's decision, their professional competence, which also leads to increasing responsibility of teachers, especially if they are authors of study courses.

Growing expectations lead to more intensive work of teachers. There are certain requirements to the work of academic staff:

- make the course goals clear, create a safe learning environment;
- in the course description a clear structure is required, description of assessment types, methods used and other;
- create a sense of belonging;
- encourage all students' participation;

- have students work together regularly;
- develop students' skills, necessary for future work;
- give clear guidance on the mode of assessment;
- find time for communicating with each student, as everyone is unique and different in their learning style, requirements, motivation, life situation;
- continually enhance their skills and knowledge.

At the same time, various elements of the legal framework reduce the attractiveness of academic careers and restrict institutional autonomy with regard to academic careers in key respects, including fragmentation and a lack of predictability and transparency (Reform of the Academic Career..., 2020). In the situation of a sudden move to remote work during COVID-19 pandemic, burnout of teachers has appeared more often and became a serious problem (Mironova and Sloka, 2022). The solution can be in involving all stakeholders (Stefenhagena *et al.*, 2020).

Growing expectations lead to more intensive work of teachers. In the situation of a sudden move to remote work during COVID-19 pandemic, burnout of teachers has appeared more often and became a serious problem (Mironova and Sloka, 2022). The solution can be in involving all stakeholders (Stefenhagena *et al.*, 2020).

OECD Skills Strategy Framework was worked out for each European country (OECD, 2019). As stated in OECD strategy, "People will increasingly need to upgrade their skills to perform new tasks in their existing jobs or acquire new skills for new jobs". It is mentioned as well that people will be more flexible what concerns skills use at work and in life. OECD names skills which will be mandatory, including social, emotional, and digital. (OECD, 2020).

The society nowadays is characterised by becoming a lifelong learning labour force, with an extremely required enhancement of their competencies, thus requiring different courses. Universities need to offer educational opportunities to people of all ages. Why HEIs? "Higher education plays a vital role in educating the current and next generation of

leaders, driving the research agenda for both the public and private sectors, and playing a critical role in shaping the direction of national economies” (HESI highlights, 2020). To ensure the competitiveness of human resources, HEIs should remain “key drivers of the innovation ecosystem”, increasing transparency and efficiency (Dehtjare *et al.*, 2022, pp.14-15).

Results

To attain the aim of the study, the quantitative design was used. The research instrument was a questionnaire, which contained 6 questions related to the current and future organizational transformation of HEIs as well as the needs of educators. Four questions were multiple-choice questions, whereas 2 questions were open-ended questions. The inclusion of open-ended questions, which were analysed by applying the content-analysis method, justified the relatively low number of content questions in the questionnaire.

Overall, 45 participants took part in the study (15 male and 30 female respondents). All participants had been teaching for at least 20 years in HEIs across Ukraine at the time of the survey. The relatively low number of participants is attributed to difficulty reaching Ukrainian academic staff currently residing in Ukraine.

Data was collected anonymously on the voluntary basis from May 24, 2022 to February 20, 2023. The questionnaire was available to participants in Google Forms.

Descriptive statistics was used to analyse demographic and content multiple-choice questions. Content analysis by keyword and frequency was used to analyse open-ended questions.

All multiple questions were answered by all participants, whereas open-ended questions were answered on average by 53% of the participants. Questions 1-4 were multiple-choice questions. The results to Question 1 “How do you think the organisation of study process in higher education will change in the nearest future?” are summarized in Table 1.

Table 1. Distribution of answers to Question 1 “How do you think the organisation of study process in higher education will change in the nearest future?”

Question aspects	Percentage of answers	Number of respondents
Study programs will become:		
• more applied and shortened	13%	6
• fully remote	5%	2
• hybrid	82%	37
Grand Total	100%	45

The vast majority of the respondents, 82%, saw the future of higher education in the hybrid format. Remarkably, 5% of the respondents thought that higher education would fully transit to remote formats.

Question 2 “Which issues do your personally face in the study process organisation?” focused on the personal academic needs of instructors. The answers are summarized in Table 2.

Table 2. Distribution of answers to Question 2 “Which issues do you personally face in the study process organisation?”

Question aspects	Percentage of answers	Number of respondents
Difficulties adapting to hybrid study process	5%	2
I don't see any problems	13%	6
Lack of motivation among modern students	29%	13
Problem in teacher-student communication	11%	5
The need to acquire additional skills (languages, IT)	42%	19
Grand Total	100%	45

The need to acquire additional skills, such as languages and IT, was acknowledged by the highest proportion of respondents (42%). Lack of students' motivation was the second most serious issue, mentioned by 29% of the respondents. A notable proportion of respondents (13%) did not see any problems related to student motivation, while the issues in teacher-student communication were

highlighted by 11% of the respondents. Only 5% of the respondents considered the hybrid model of education a problem.

Question 3 focused on the identification of academic competencies that respondents were willing to improve. The summary of responses is provided in Table 3.

Table 3. Distributions of answers to Question 3 “What are the areas in which you would like to improve your professional competence?”

Question aspects	Percentage of answers	Number of respondents
Communication with students	7%	3
Human resources management in HE	11%	5
Modern teaching methods	16%	7
Remote teaching tools	9%	4
Design of study curricula according to the EU requirements	7%	3
Other, specified	36%	17
Other, not specified	14%	6
Grand Total	100%	45

Five areas of competencies were available for selection in this answer. The area that was selected by the highest number of respondents included modern teaching methods (16%), which was followed by human resource management in HE (11%). Only 9% of the respondents thought they had to improve their competencies in remote teaching tools. The lowest number of respondents selected communication with students and design of study curricula according to the EU requirements (7% each). Various competencies that required further development were indicated in the answer “Other, please, specify” by 36%. The answers could be summarized through the prism of various needs, such as the

need to enhance language and IT skills, to embrace lifelong learning approaches, to enhance writing of scientific papers, to enhance skills related to participation in international projects, and to acquire skills preventing professional burnout.

As academic challenges of instructors are linked to student profiles, Question 4 asked the question of “How has the profile of a typical student of 2022 changed compared to the student of 2002?” The vast majority of the respondents (85%) indicated a significant change in the student profile since 2002. Only a small number of the respondents (6%) did not observe any change.

Question 5 was an open-ended question about generally anticipated changes in higher education. The answers are summarized in Table 4.

Table 4. Distribution of answers to Question 5 “What changes do you think will happen in the organisation process of higher education?”

Question aspects	Percentage of answers	Number of respondents
Amount of HEIs or study programmes will decrease	17%	5
Study programs will be shortened	8%	2
Competition within HEI will increase	8%	2
Study programs will become more applied	8%	2
New technologies in future HE	14%	4
Life learning approaches will be on increase in education	10%	3
Remote/online studies in future HE	14%	4
HE will become more customised	21%	6
Grand Total	100%	28

The obtained answers could be summarized as follows. The response “HE will become more customized” constituted 21% of the responses, which was followed by the opinions of the decrease of the number of HEIs and study programs (17%), introduction of new technologies in HE (14%) and remote education (14%). Life learning approaches will be more widely used (10%). Other trends include higher competition on the HEI market (8%), more practical study programs (8%) and more practical orientation of training (8%).

Question 6 was an open-ended question focusing on changes in HE caused by the war. Only 45% of the respondents answered this question. Half of the respondents reported the decrease in the numbers of both students and educators, which was presented as a negative impact on the educational system overall. The next set of problems, which constituted 30% of all answers, related to financial problems. Other problems included the quality of facilities and prestige of HE in society, poor work opportunities in HE and issues of consolidation of universities in Ukraine.

This study aimed to determine areas of changing organisational management process in HE in Ukraine. Overall, it was determined that the current and imminent transformation of HE is related to the increasing competition on HE markets, decreasing number of students

and academic staff, financial challenges and new technologies.

Regarding research limitations, the study encountered several complicating factors. Firstly, the study was conducted remotely, which posed challenges. Regardless, the study holds scientific value, and its findings can be indirectly interpreted and applied to European HEIs as well. As previously mentioned, the level of higher education in Ukraine and the skills of Ukrainian students are relatively comparable to those in many European countries. Therefore, the results of the study can have relevance and implications for European HEIs.

This is a pilot study, regarding future research, it would be advisable to compare the data obtained from Ukrainian respondents with data from EU countries. Since the study involved academic staff, it would be meaningful to conduct a new research that examines whether HE management considers the acquisition of the mentioned skills by academic personnel necessary for enhancing the overall competitiveness of the institution. Finally, as a culmination of an extensive study, it would be worthwhile to develop a model that specifies how the methodology of knowledge transfer in higher education should evolve, taking into account the changing profile of the modern student, their needs, and the needs of the teaching staff.

Conclusion

The aim of this research was to identify the perception of academic staff related to imminent transformation of HEIs organisation management and the needs of academic staff in pertinence to such transformation. Overall, in the view of academic staff, the imminent transformation of HE in Ukraine will be related to the increased competition among HEIs related to the decreased number of students and educators, use of new technologies, and hybrid models of education, in which the remote education is expected to increase its share. However, financial problems of HEIs will probably compel HEIs to design new models of HE, which might be based on transformation of study programs, which might become shorter, more applied and fewer in number. To be able to function in the transforming HE, in the view of academic staff, they should enhance their IT, language, scientific writing, burnout preventive skills,

embrace methods of lifelong learning, modern teaching methods and human resource management skills. These changes encompass various factors, including the implementation of a design thinking approach, an agile education process, and the introduction of modern teaching approaches. However, it is crucial not to overlook the most important element - the human factor.

As consumers and the environment evolve, HE service providers must also adapt process of organisational management. The research has identified several gaps where the professional competence of academic staff needs improvement, encompassing both soft skills (such as languages, digital literacy, and communication) and hard skills (related to methodology). A positive finding is that academic staff recognize the necessity for change, raising the question of whether management will be supportive enough to foster and motivate these changes.

Acknowledgements

The elaboration of this pilot study took part within the framework of EKA University of Applied Sciences project No. 16-20.2 “21st century skills”.

References

- Brown, PG (2018). Will Technology and Distance Instruction Save Higher Education? // *Counterpoints*, no.517: 301–313. - <http://www.jstor.org/stable/45178177> [2023 05 30].
- CEDEFOP (2022). Skills comparison between Ukraine and the EU. - <https://www.cedefop.europa.eu/en/news/skills-comparison-between-ukraine-and-eu-27>[2023 06 05]
- Dehtjare, J., Djakona, V., Lapaine, T., & Riashchenko, V. (2022). Changing Approach to the Development of Higher Education in Latvia: Key Drivers // *Management Theory and Studies for Rural Business and Infrastructure Development*, no.44(1): 13–19 – <https://doi.org/10.15544/mts.2022.02> [2023 06 03].
- El-Azar, D. (2022) 4 trends that will shape the future of higher education // World Economic Forum. - <https://www.weforum.org/agenda/2022/02/four-trends-that-will-shape-the-future-of-higher-education/> [2023 06 10].
- Faller, P., & Marsick, V. J. (2023). Rethinking transformative learning practices to respond to workplace complexities: Toward an integrative framework. *New Directions for Adult and Continuing Education*, 2023(177), 91-103. <https://doi.org/10.1002/ace.20481>
- HESI highlights the role of higher education in building a better world for current and future generations. - <https://www.unesco.org/en/articles/hesi-highlights-role-higher-education-building-better-world-current-and-future-generations> [2023 6 16].
- Humanitarian Response (2022). *Ukraine: Higher Education Needs Assessment*. - <https://www.humanitarianresponse.info/en/operations/ukraine/document/ukraine-higher-education-needs-assessment-25-october-2022> [2023 06 11].
- Karkkainen, K., Jaaskela, P., & Tynjala, P. (2023). How does university teachers' pedagogical training meet topical challenges raised by educational research? A case study from Finland // *Teaching and Teacher Education*, no.128, 104088.- <https://doi.org/10.1016/j.tate.2023.104088> [2023 06 09].
- Mironova, J., Sloka, B. (2022). Burnout in the Higher Education Institution. 12th International Scientific Conference BUSINESS AND MANAGEMENT 2022, Vilnius, Lithuania. – <https://doi.org/10.3846/bm.2022.859> [2023 06 11].
- OECD Skills Strategy 2019: Skills to Shape a Better Future. OECD Publishing. - <https://doi.org/10.1787/9789264313835-en> [2023 06 15].

OECD Skills Strategy Latvia 2020: Assessment and Recommendations. OECD Library. –<https://www.oecd-ilibrary.org/sites/66164699-en/index.html?itemId=/content/component/66164699-en&mimeType=text/html> [2023 06 11].

Reform of the Academic Career Model in Latvia: Analysis of Legislation, September 2020. https://www.izm.gov.lv/sites/izm/files/data_content/aki_reforma_latvija-normativa_regulejuma_analize_i_angliski.pdf [2023 11 04].

Rieg, N. A., Gatersleben, B., & Christie, I. (2021, June 29). *Organizational Change Management for Sustainability in Higher Education Institutions: A systematic quantitative literature review*. MDPI. <https://www.mdpi.com/2071-1050/13/13/7299>

Rivas, D.F., Boffito, D.C., Faria-Albanese, J., Glassey, J., Cantin, J., Afraz, N., Akse, H., Boodhoo, K., Bos, R., Chiang, Y.W., Commenge, J.-M., Dubois, J.-L., Galli, F., Harmsen, J., Kalra, S., Keil, F., Morales-Menendez, R., Navarro-Brull, F.J., Noel, T., Ogden, K., Patience, G.S., Reay, D., Santos, R.M., Smith-Schoettker, A., Stankiewicz, A.I., Van Den Berg, H., Van Gerven, T., Van Gestel, J., & Weber, R.S. (2023) Process intensification education contributes to sustainable development goals. Part 2 // *Education for Chemical Engineers*, no.32: 15-24. - <https://doi.org/10.1016/j.ece.2020.05.001> [2023 06 12]

Stachowska, S., Czaplicka-Kozłowska, I. (2020). Motivating Employees of the Higher Education Institution: Case Study of Academic Teachers // *Management Theory and Studies for Rural Business and Infrastructure Development* Vol. 41(4):589-599. <https://doi.org/10.15544/mts.2019.48> [2023 06 20].

Stefenhagen, D., Vanaga, I., Grinfelde, A. (2020). Working Conditions of Academic Personnel of Higher Education Institutions in Latvia // *Proceedings of the 2020 International Conference "Economic Science for Rural Development" No 54, Jelgava, LLU ESAF, 12-15 May 2020, 258-265.* - https://llufb.llu.lv/conference/economic_science_rural/2020/Latvia_ESRD_54_2020-258-265.pdf [2023 06 15].

Štemberkova, R., Kuča, K., Marešova, P. (2019). Motivation of Academic Staff at Universities in the Czech Republic: Qualitative Research. – <https://digilib.uhk.cz/bitstream/handle/20.500.12603/178/%C5%A0TEMBERKOV%C3%81%2C%20KU%C4%8CA%2C%20MARE%C5%A0OV%C3%81%20rev%20SOI.pdf?sequence=1&isAllowed=y> [2023 06 15].

Teo, T., Unwin, S., Schere, R., Gardiner, V. (2021). Initial teacher training for twenty-first century skills in the Fourth Industrial Revolution (IR 4.0): A scoping review // *Computers & Education*, no.170, 104223. – <https://doi.org/10.1016/j.compedu.2021.104223> [2023 06 16]