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THE FUTURE OF UNIVERSITY EDUCATION – IS THE HEYDAY OF BLENDED LEARNING PROCESS COMING? *

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Abstract. The aim of the current study is to understand the opinion and attitude of students and university professors about the quality of the learning process of these three forms of education – traditional, online and blended/ hybrid and in general their attitude of using new technologies in learning process of the universities. We conducted an empirical study (n=427) among university professors (31) and university students (396). Our findings reveal that students and university professors express preference for blended/hybrid type of education, comparing to traditional face-to-face or online education. 47% of respondents prefer blended/ hybrid learning over traditional (41%) or online (12%). Blended/ hybrid learning process receives the largest acceptance for the following advantages: personal attention from the professors; improved communication and flexibility and convenience. At the same time, 66% of respondents are convinced that new technologies have positive (31%) and even very positive (35%) impact on their motivation to learn. This result clearly proves the need for deeper integration of the new technologies in the educational process in universities.

Keywords: blended learning; online education; hybrid education; higher education institutes; digitalization

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JEL Classifications: I0, I21, I23

1. Introduction

The customs and habits of young people (predominantly representatives of Generation Z) who are now in the university's courses confront universities with several very serious challenges. First of all – how to be more visible for them – terms such as reputation, long-lasting educational traditions, classical learning are not as important to today's students as they were to their predecessors 5-10 years ago. This fact forces universities to develop and actively maintain their profiles on social media. Secondly, once this attention is caught, to secure the proper choice of young people - by providing university sites with chatbots (available 24/7 at the disposal of potential students, parents, relatives, etc.) or a complete online procedure for submission documents and admission of students in Bachelor, Master and Doctoral Degrees), etc. Thirdly, to stay attractive for young people during their active years of university education - including by using all possible solutions of new technologies, providing modern educational content, focusing on new technologies, a mixture of individual and group assignments, different cases from practice, etc. In this line of consideration, especially in post-COVID-19 times, the form of education (traditional, online or hybrid) comes to the agenda. Even at first

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glance, all educational forms have strengths and weaknesses. Traditional education brings direct communication between lecturer and audience, which is important for the quality of the education. At the same time, it does not allow any high level of flexibility, especially when it comes to scheduling (which is important for the workload at present days).

On the other hand, online education and lessons provide sufficient flexibility and adaptability for both professors and students. Here, the main weakness is the lack of direct communication, again for lecturers and students. A hybrid form of education, however, could combine the strengths of traditional and online education and, at the same time – overcome, to some degree, their major weaknesses.

The current study aims to understand the opinions and attitudes of students and university professors about the quality of the learning process of these three forms of education – traditional, online and blended/ hybrid and, in general, their attitude toward using new technologies in the learning process of the universities. Based on the analysis of the collected responses, we understand their preferences, and with this information, we propose some ideas and recommendations for improvement of the quality of the educational process in universities, considering the opinion of the main stakeholders.

2. Literature review

The COVID-19 and post-pandemic years have created favourable circumstances for many researchers devoted to the digital transformation of the education system, some of them – directly focusing on the specifics of tertiary education. Therefore, there is now a sufficient number of studies exploring different aspects of digital change in the educational process in recent years.

For instance, Hossain et al. (2021) conducted research devoted to the assessment of online education and its reflection on the fear of academic delay during the pandemic years among university students in Bangladesh. They reported that approximately 60% of the students exhibited high levels of fear of academic delay and experienced significant stress. The results of a quality study conducted by Bruggeman et al. (2022) have revealed a broad spectrum of lecturers' perceptions about online education imposed during the pandemic – from fear and different levels of stress on one side to enthusiasm on the other. They have outlined several critical points in online education – connection with students and colleagues, digital learning process – opportunities but also threats, transformation of the role of university professor, time pressure and different kinds of support.

Alania-Contreras et al. (2024) focus on the evolution of students' opinions on the acceptance of online education in Peru. They registered a very weak positive acceptance trend. According to them, in the initial and intermediate phases of research, they observed a predominantly weak negative attitude, largely stemming from the institution's lack of experience and inadequate digital infrastructure. However, by the final stage, this attitude shifted to a mildly positive one as the institution adapted to the new circumstances and recognized the necessity of online education (ibid). Generally, the majority of students accept the online education process, especially in force majeure circumstances (Muthuprasad, Aiswarya, Aditya, Jha, 2021), but at the same time, express their preference for the traditional face-to-face learning process (Aguilera-Hermida, 2020). In this regard comes the research of Madani, Adhikari and Hodgdon (2024), who claim that students tend to appreciate online learning when they believe it enhances their learning outcomes and performance (performance expectancy) and when they perceive e-learning tools as user-friendly (effort expectancy). Authors reveal that, unlike faculty members, students are also significantly influenced by social factors, such as peer pressure and perceived status (social influence), in their acceptance of online learning.

Moreover, the shift in classroom dynamics, particularly changes in the power relationship between professors and students in the online teaching environment, is less of a concern for students than for faculty (ibid). At the same time, Angelova (2020) reveals that students perceive the quality of online lectures to be equivalent to that of traditional face-to-face lectures. However, opinions on the intensity of online learning are mixed, with a slight majority suggesting that online lectures are less intense than traditional ones. While students believe

they perform individual tasks more easily in an online environment, they find online team-based tasks more challenging (ibid).

Some authors argue that students, representatives of risk groups and different types of minorities face serious challenges in adaptation to online learning courses (Edmunds, Gicheva, Thrift, Hull, 2021). Hamdan et al. (2021) observe notable differences in student satisfaction based on factors such as education level, type of university, and marital status. According to them, key predictors of students' satisfaction with online education included self-regulated learning, internet self-efficacy, interactions between learners and content, interactions among learners, and the number of theoretical courses offered through e-learning. Tang et al. (2021) pay attention to the level of readiness of different types of students to the online learning process. They found out that postgraduate students demonstrate a significantly higher level of readiness across most dimensions compared to undergraduate and sub-degree students. The level of acceptance of online education is closely connected to the satisfaction of the quality of this education. In this regard, Sitar-Tăut, Mican and Moisescu (2024) claim that student satisfaction is positively affected by perceived usefulness, ease of use, health safety, and the alignment between tasks and technology, while it is negatively influenced by feelings of social and professional isolation.

In contrast, convenience, well-being challenges, technostress, and privacy-related risks do not significantly impact satisfaction with online education. Additionally, satisfaction, social disengagement, and social norms shape students' propensity for online learning and their intentions to withdraw from it (ibid). Tseng, Wu, Lian and Zhuang (2023) consider the importance of the platform type for the effective online process. Their findings suggest that instructional support, instructor enthusiasm, and preparedness are critical factors in shaping the perceived value of online learning platforms for acquiring internet entrepreneurship knowledge and skills. According to the scholars, this perceived value, in turn, has a positive effect on the intention to reuse such platforms. Additionally, they admit that the intention to reuse online platforms significantly enhances positive learner responses. The relationship between perceived value and reuse intention is stronger for free platforms compared to paid ones (ibid).

At the same time, Kim and Chung (2023) pay attention to one very critical point in e-learning – the effectiveness of safety education in the e-learning environment, which is a very serious matter, when we consider the strengths and weaknesses of the e-learning process.

Based on the progress of new technologies and the latest trends in education, Ryneveld (2023) proposes a special framework for fully online distance education. Sulistiyani, Meutia and Firmansyah (2024) define four major elements for adopting an effective online learning process: technology, adequate infrastructure, organization and human resources. Lou and Li (2024) developed a model that defines the online education student learning status based on the dual improved neural networks. Adib (2024) examines how experiential learning influences student attitudes toward sustainability. According to the scholar, integrating additional business simulations (based on the new technologies) into curricula is contingent upon students' willingness to engage with these experiential learning tools in the future, as well as the impact of positive word-of-mouth stemming from their experiences. However, Savolainen (2023) explains that staff's social skills significantly influence the safety of learning environments, the teaching tools and resources they utilize, the effectiveness of information flow, and their knowledge of safety and security protocols.

A lot of scientific interest is put into the blended learning process – a good combination and mix of online and traditional lessons in university. The so-called "blended" or hybrid education process is considered a useful tool for the modern educational system, including the tertiary education level. In this regard, Bruggeman et al. (2021) have defined several adaptive points important for the blended learning process, such as the education-oriented learning process, willingness to change, experiments and discussion, creative sustainable integration of new technologies in the education process, critical self-reflection, etc. Choi, Robb, Mifli and Zainuddin (2021) pinpoint the strengths of the blended education process. According to them and the conclusions of their research, the effective implementation of online learning requires the integration of blended education to enhance the learning experience. They also pay attention to the effective communication between lecturers and students, which is a critical factor for success, irrespective of the type of class involved. Minadzi and Segben-

ya (2024) prove the power of human resources in blended learning, and Li and Yoon (2024) provide specific knowledge on blended education in tertiary education. Interesting research on specifics of blended learning is developed by Graham and Halverson (2022), Stap et al. (2024), Hossain, Salam and Akhond (2024), McLean et al. (2019), Adarkwah and Huang (2023) etc.

Blended type of education is considered also applicable and adequate in very specific cases such as education and training in nuclear engineering for instance is (Frybortova et al.; 2024); medical education (Abuzaid; 2024); education in the field of security (Stoykov, 2024); engineering education (Dimcheva, Stoyanov, 2024). Some authors even go deeper and explore, for example, the benefits of online gamified education activities (Gao, 2025), the usage of virtual reality technology in sports education (Pan, 2024), and game-based education in finance (Cannistrà, 2024).

Hurajova, Kollarova and Huraj (2022) conclude that modern online technologies play a crucial role in maintaining the adaptability of the educational process during emergencies. At this line, authors are expected to remain an essential component of university education, securing the sustainability of tertiary education in the near future.

3. Method

The aim of the current study is to understand the opinions and attitudes of students and university professors about the quality of the learning process of these three forms of education – traditional, online and blended/hybrid and, in general, their attitude toward using new technologies in the learning process of the universities. Based on the analysis of the collected responses, we could understand their preferences, and with this information, we could propose some ideas and recommendations for improving the quality of the educational process in universities, considering the opinions of the main stakeholders.

In order to achieve this major goal, we went through several key tasks as follows:

- to explore the existing scientific literature on the different forms of education (online, hybrid and traditional) with special attention to blended research;
- to develop special questionnaire designed for the needs of the current study, covering all aspects of the formulated hypotheses;
- to spread as much as possible the questionnaire among our main target group – namely students in full-time programmes (Bachelor, Master and Doctoral) and university professors having classes in these programmes.
- to define sufficient period for the target group to fulfil the questionnaire
- to develop a comprehensive analysis and conclusion based on this analysis
- to propose workable solutions for blended learning.

We started by defining of two hypotheses which we intend to explore comprehensively through our empirical research:

The first hypothesis: Students are willing to explore different learning tools and methods based on new technologies (such as virtual reality, gamification, etc.) during their university classes.

The second hypothesis: Full-time students prefer blended/ hybrid learning processes to only traditional face-to-face classes or fully online learning.

Therefore, our major target group consists predominately of students in full-time programmes and their lecturers. The questionnaire contains 20 closed questions in total, 3 of which are devoted to the demographic characteristics of responders. The research is based on the results of the empirical study, released among university students (500) and university professors (50), using online form. The questionnaire was distributed among university students and university professors within the University of National and World Economy as one of the biggest business universities in Southeast Europe. At the same time, this current empirical research is a part of overall study, entitled Digitalisation of the learning process in Higher Education - Identification and Management Model, funded by the Bulgarian National Science Fund. As a result, we have received answers

from 396 students and 31 university professors – or 427 responses in total. The demographic profile of responders is presented in Table 1.

As can be seen from the table below, predominately in the students group, we have female responders 59% (versus 41% male responders). In terms of the programme, the major group of responses comes from students in a Bachelor full-time programme (88%), followed by students in a Master's degree programme (7%) and a Doctoral programme (5%). This structure of responses shows the active and engaged part of students from one side (traditionally, students in the first two years of education in bachelor programmes are more active and show more engagement with university life). On the other hand, the low share of Master students is explicable with the proportion in reality, but also with a traditionally weaker commitment of these students to university activities other than their focused curricular assignments. Impressive group of responded students are between 18-23 years old (92%), followed by those aged 24-29 years (5%) and logically, the smallest group is formed by students over 30 years old (3%). This proportion could be considered once again as evidence that the more active group of youth in terms of social media, internet, etc., with the desire to express their opinion about new technologies and trends is the group between 18-23 years old university students.

Table 1. Demographic profile of the respondents

University students (396 responses)						
Gender	Male	41	Female	59	Other	0
Programme	Bachelor	88	Master	7	PhD	5
Age	18-23 years old	92	24-29 years old	5	30+ years old	3
University professors (31 responses)						
Gender	Male	47	Female	53	Other	0
Age	Up to 35 years old	26	36-45 years old	39	46+ years old	45
Position	Professors	39	Associate professors	23	Assistant professors	40

Source: Own research

As far as the profile of university students is concerned, we have again a slight predominance of female responders (53% over 47% male). In terms of age, the major representative group here is formed by people over 46 years old (45%), followed by the group of 36-45 years old (39%), and the smallest group is university lecturers up to 35 years old (26%). The university academic position is another aspect we explore within the demographic profile of responders. Here, we have an almost equal proportion of university professors (39%) and assistant professors (40%). The associate professors comprise the smallest respondent group (only 23%).

4. Results and Discussion

The questionnaire contains 17 closed questions, exploring the attitude of students and their lecturer in the different aspects of blended/ hybrid learning process. We start with the direct question: Which type of education do you prefer with three possible options of answers: hybrid learning; traditional face-to-face learning or online learning. We purposely chose to start our survey with this particular question for two main reasons: first, it's a straightforward question that we ask for respondents' first-hand opinions without too much thought. Here, we aim to understand their initial attitude, referring to the experience of the previous years during the Covid-19 pandemic and the post-pandemic years, within which new trends in the educational process at different levels of education were imposed. Results are presented in Fig. 1.

The results of the question are definitive on only one line - and this is the attitude that respondents demonstrate towards online education - only 12% of respondents claim that they prefer a fully online learning process. The rest of the responders are spread into two almost equal groups, with a small predominance of the group choosing blended/ hybrid education (47%), followed by the "conservative" group, which prefers only the traditional face-to-face education process. This relatively small distance between these two groups could be considered a result of the type of educational programme our respondents used. The main focus of full-time students should be learning; therefore, their efforts must focus on achieving as much high quality of the educational process as possible. Here comes the logic of preference between these two major groups. Here, we also

have to consider that this question is too general (as a first question), and the analysis of the results of the following questions will give the desired nuance of acceptance and preferences of university students in different types of education forms.

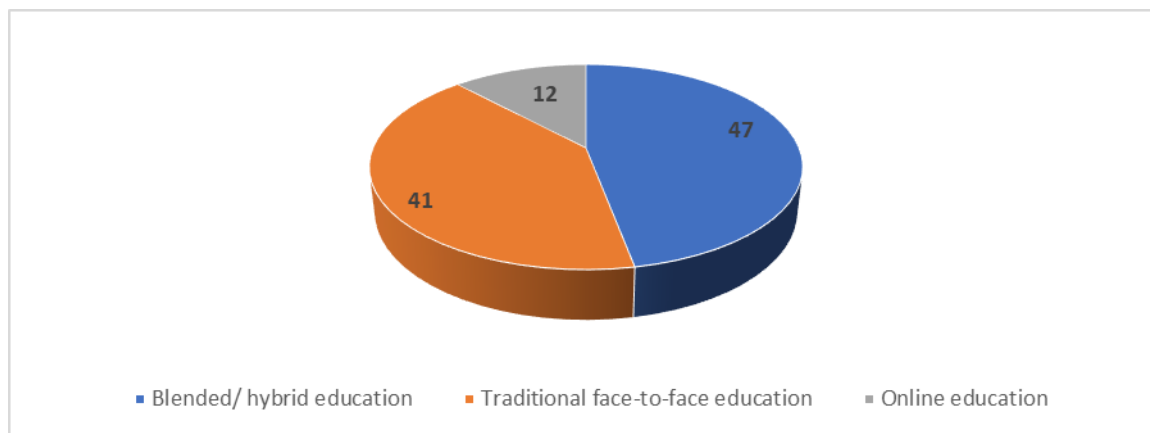


Fig. 1. Preferences about the type of education process (in %)

Source: Own research

The second question is, "How do you rate the efficiency of the hybrid learning process compared to the face-to-face learning process?" (Fig. 2).

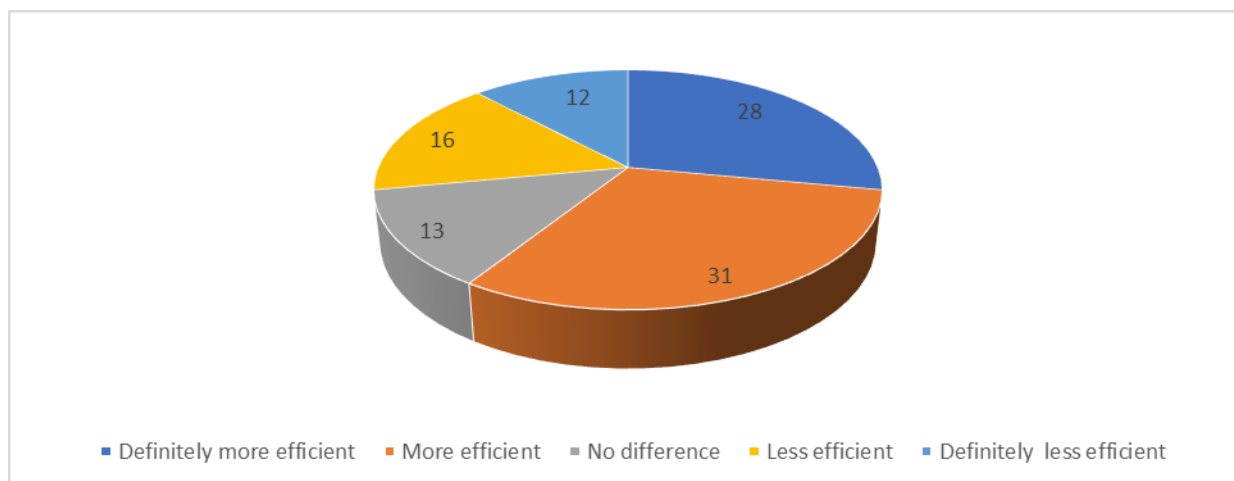


Fig. 2. Assessment of the efficiency of the hybrid learning process compared to the face-to-face learning process (in %)

Source: Own research

The results of this question are categorical: 59% in total of our respondents are positive that the blended learning process is more efficient than the traditional one (31% found that it is more efficient, and another 28% claim that it is definitely more efficient). At the same time negative responses form 28% in total (12% definitely less efficient and 16% - less efficient), while 13% report that there is no difference in efficiency in these two types of education. This result confirms the initial tendency to accept the blended learning process over the traditional one.

The next question is similar to the previous one, but this time, respondents are asked to assess the efficiency of online education compared to the traditional ("How do you rate the efficiency of online learning compared to face-to-face?"). Results draw an interesting picture (Fig. 3).

34% in total (16% definitely efficient and another 18% - efficient) find that the online learning process is more efficient than the traditional face-to-face learning process. The majority of the respondents – 51% in total have the opposite opinion – the online learning process is less efficient than traditional (31% - less efficient and

another 20 – definitely less efficient). Here, the percentage of people who do not find a difference between the two types of educational process remains relatively high – 15%.

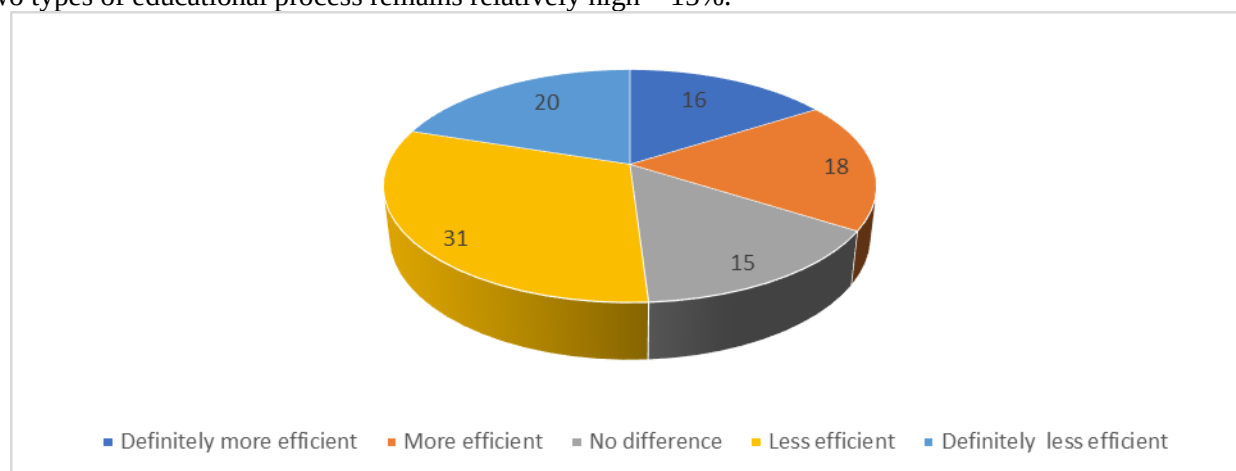


Fig. 3. Assessment of the efficiency of the online learning process compared to the face-to-face learning process (in %) Source: Own research

The next question reveals the level of satisfaction with the communication process between students and their lecturer and is the following: "What is your satisfaction with the communication with the teachers in the different types of education?" (Fig.4).

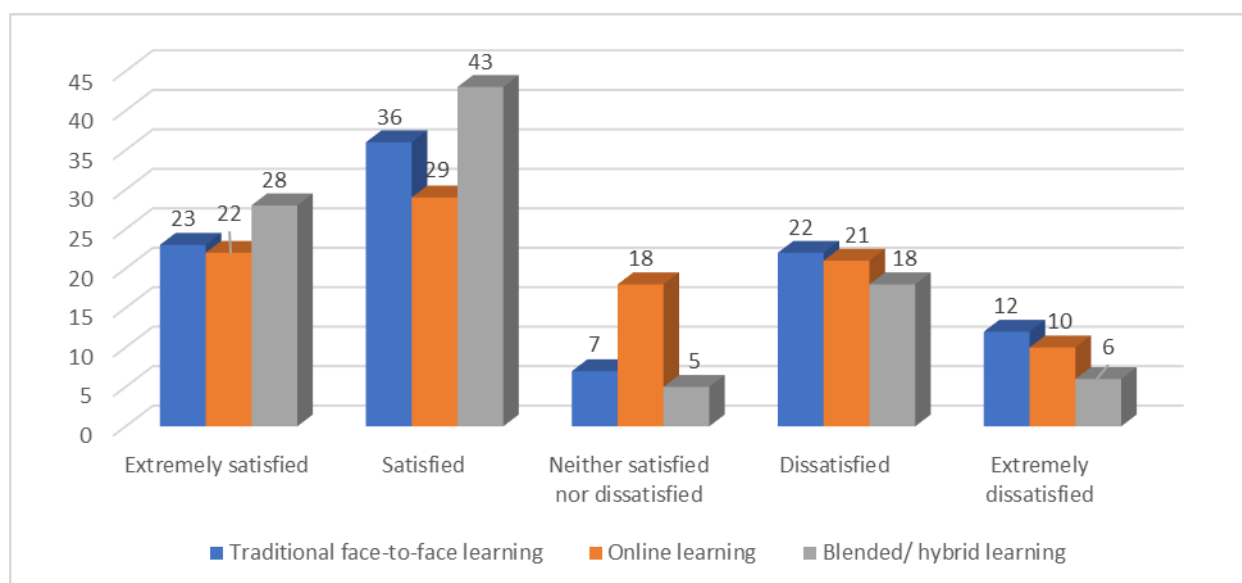


Fig. 4. Share of satisfaction of the communication process between students and their lecturers (in %) Source: Own research

As can be seen from the figure above, in all three types of education, students and professors demonstrate a relatively good level of satisfaction in communication with each other. The highest share of extreme satisfaction was received through communication in the blended/ hybrid learning process (28%), followed by traditional learning (23%), and with a small difference in third position comes online learning. This result is reasonable, considering two important facts: students are representative of the generation which has grown up with new technologies and is used to communicating primarily through digital applications and secondly, blended learning deals with major weaknesses of online learning, including lack of sufficient direct communication between students and professors. The level of satisfaction (second category), in fact, deepens the observation in the first one – the highest level of satisfaction goes to the hybrid/ blended learning process (43%), followed by face-to-face education (36%), and the last position is for online education (29%). At the same time, the share of people who are not sure if they are satisfied with the communication in different types of

education marks its highest score, namely in online education (18%). This finding could be explained again in the dichotomous germ of the type of communication most respondents are used to.

On the one hand, they use digital communication literally every minute, mostly in their private life. Therefore, maybe one part of the respondents could not find satisfaction in the mix between different types of communication – private and university/ academic life. At the same time, it is possible that some respondents do not take communication as seriously in an online environment, perhaps due to the greater possibility of distraction. It should also be noted here that the traditional form of education has the highest levels of dissatisfaction, albeit by a small margin from the other two.

“What is your satisfaction with communication with other students in different types of education?” is the next question from the survey (Fig.5). Obviously, communication in the traditional face-to-face learning process is preferred as this is the type, where both university students and professors claim that it is extremely satisfied. 87% of our respondents found communication between university students in traditional educational environments satisfactory (45% - extremely satisfied and 42% - satisfied), and only 12% of respondents found this type of communication unsatisfactory. At the same time, the total share of satisfaction from communication between students in hybrid/ blended learning process is 65%, while the total share of dissatisfaction is 31%.

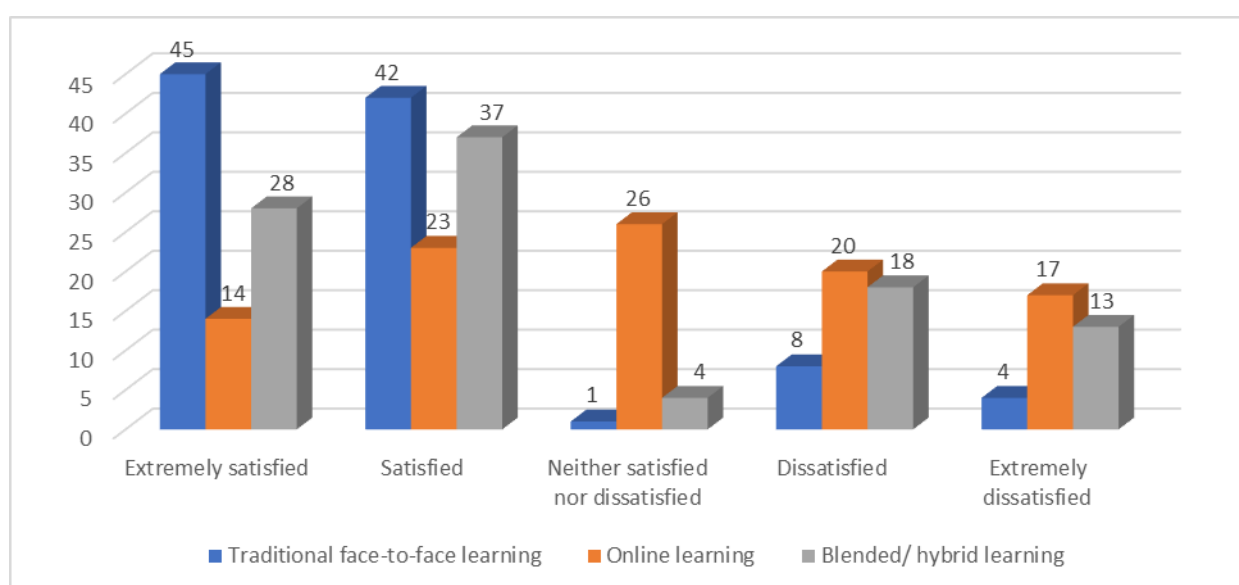


Fig. 5. Share of satisfaction of communication process between students (in %)

Source: Own research

At the same time, the online learning process marks the lowest level of satisfaction in communication between students – only 37% of them in total (14% extremely satisfied and 23% satisfied) claim that the communication is satisfactory. Here the level of lack of satisfaction is highest – 37% in total, while another 26% claim that communication is neither satisfied nor dissatisfied. Here, one of the advantages of the traditional educational process, which is obviously recognized and accepted by both sides, manifests itself the most - direct communication. Although the students themselves are used to new technologies and digital communication in a personal capacity, when it comes to communication related to the learning process and work tasks, they prefer direct communication.

The next question is, "How convenient is the access to the learning materials in different types of education?" (Fig. 6). The results unequivocally show here one of the biggest advantages of digitization in terms of education, namely the easy access to various educational materials. As can be seen from the figure, traditional forms, in this sense, are significantly behind the possibilities that new technologies provide. In this regard, it is very easy to explain the advantages of online learning and hybrid learning, which have relatively similar results. However, the total share of people feeling comfortable and very comfortable in access to educational materials in blended learning is 72%. In comparison, this share in online learning is 71%, which is not signifi-

cant. At the same time, a traditional form of education face-to-face marks only 27% in total, which could be explained again by the customs and habits of today's university students. They are used to reading and studying from digital materials (including easy orientation in the digital environment and the easiest way for them when they have to search and explore concrete subjects) rather than in traditional hard-copy books, manuals and other educational materials.

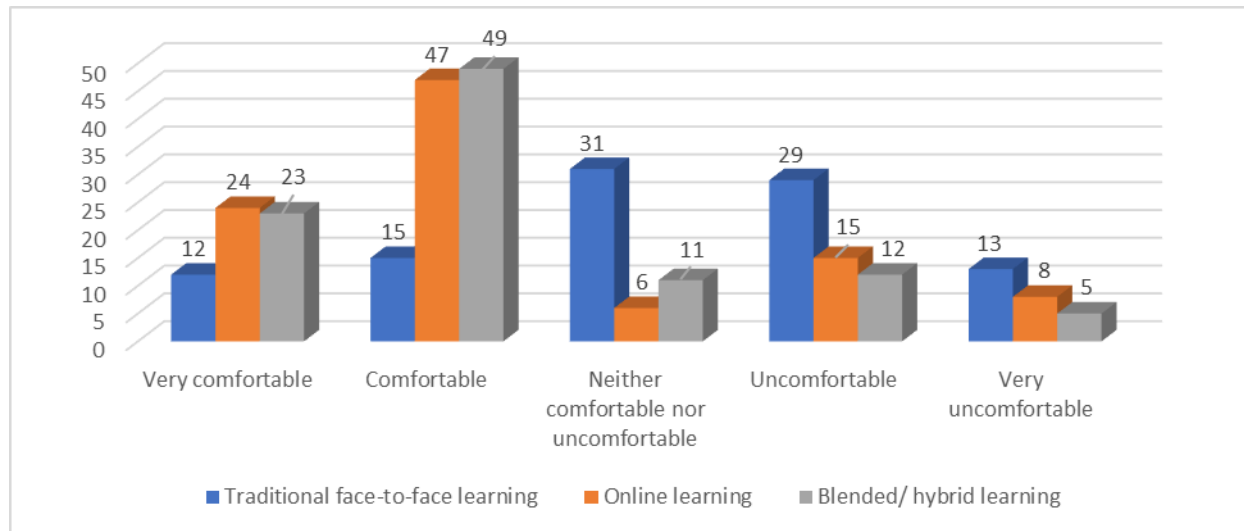


Fig. 6. Comfortability of access to learning materials in different forms of education (in %)

Source: Own research

The next question is, "How do you rate the flexibility of the learning process in different forms of education?". Results are presented in Fig. 7.

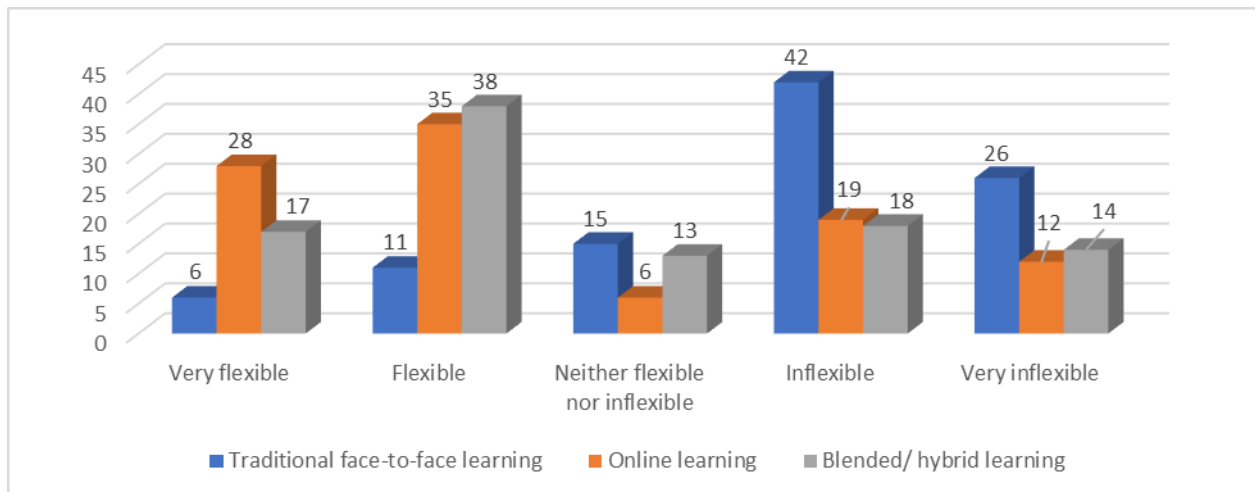


Fig. 7. Flexibility of the learning process in different forms of education (in %)

Source: Own research

Again, the results are clear and present evidence of the advantage of digitalization in education – more flexibility for all stakeholders, especially students. The online learning process gives more flexibility (63% of responses in both levels), while on the opposite opinion, 31% of our respondents. The flexibility of online education collected the biggest share of responses in the assessment "very flexible" – 28%, which is a significant score, especially compared to the result here of blended learning - only 17% of respondents claim that blended mobility is very flexible. This result is logical, including the positioning of the flexibility of the blended learning process – namely between traditional and online learning. At the same time, 68% of respondents admit that traditional learning is not flexible, while for the blended learning process, this share is almost half – 32%. This means that blended or hybrid learning processes can overcome the weaknesses of traditional and online

learning, offering a good environment and combining traditional forms of education and opportunities for new technologies.

The next question is "Do you encounter technical problems with different forms of education?". It aims to understand how respondents are technically prepared for the different types of learning processes (Fig. 8).

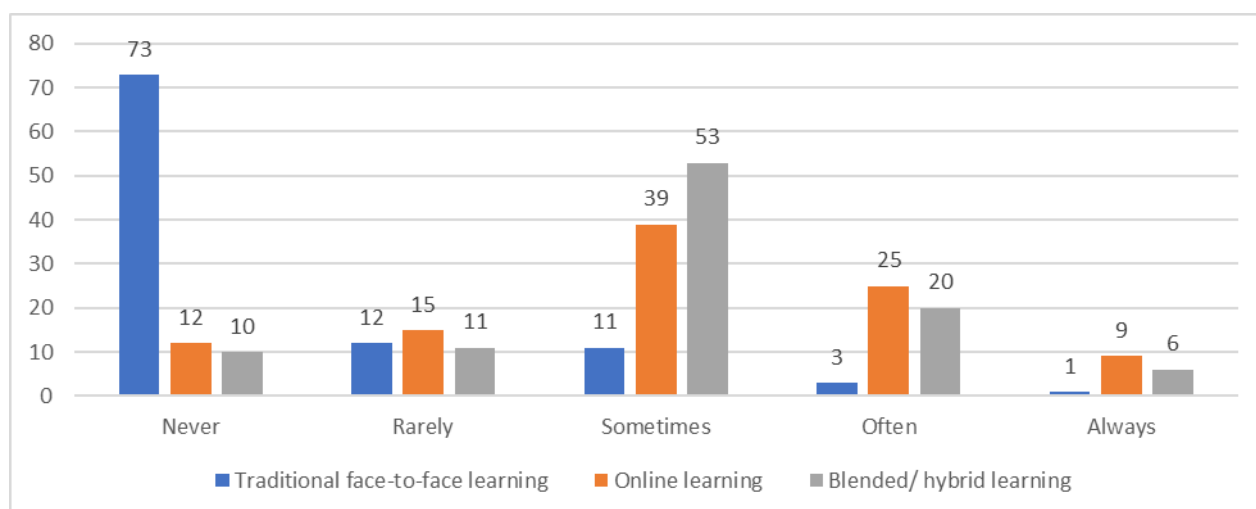


Fig. 8. Frequency of technical problems in different forms of education (in %)

Source: Own research

Based on the results, we could consider that, in general, for all types of educational processes, no serious technical difficulty is foreseen, both in terms of students and in terms of their teachers. This speaks of a rather high technical culture both students and lecturers possess. On the other hand, it should be noted that, logically, with the traditional form of training, the least difficulties of a technical nature are noticed (as many as 73% states that they never had technical problems with this form of training). This categoricalness is normal, bearing in mind the relatively limited technical resources that are used in the traditional educational process, especially compared to the online education process. The majority of respondents here choose "sometimes" when it comes to online (39%) and blended learning (53%). At the same time, 25% of respondents admit they often encounter technical difficulties in online learning, and 20% in blended/ hybrid learning. Here, we do not go into any deep research regarding the type of technical problems - they can be both from the lack of Internet due to unexpected power outages and the lack of a good technical means with which the educational process can be carried out online without any problems in a digital environment.

The next question is "What do you think are the main advantages of different forms of education?" and the respondents have the opportunity to choose here more than one answer (Fig. 9). The results are apparent and highlight the benefit of the mixed educational process - out of all 5 positions of the question, it receives the largest share of three: personal attention from the professors; improved communication and flexibility and convenience. Flexibility and convenience represent a complex indicator, and its complexity gives the leading place to the blended/ hybrid learning process. On the other hand, personal attention from the professors was recognized as an advantage of the blended educational process by 43% of respondents. In comparison, the traditional form of education here collects 36%, and online learning - only 28%. The key to these results may again lie in the way of communication that today's students are used to. A personal e-mail or chat between a professor and a student may be perceived by the student as a much more individual communication than the direct form of communication in a traditional auditorium when the student is in the company of other colleagues. The same comment could be relevant for the criterium "improved communication", which again leads to the first-place blended learning process.

At the same time, the traditional education process is a leader in one position – more social interactions with a share of 43%, compared to blended learning with 34% and the online education process with 12%. Here, the specifics and benefits of direct presence and communication between colleagues in an academic environment

have their best projections. For its part, the online education process is leading in terms of improved access to learning materials.

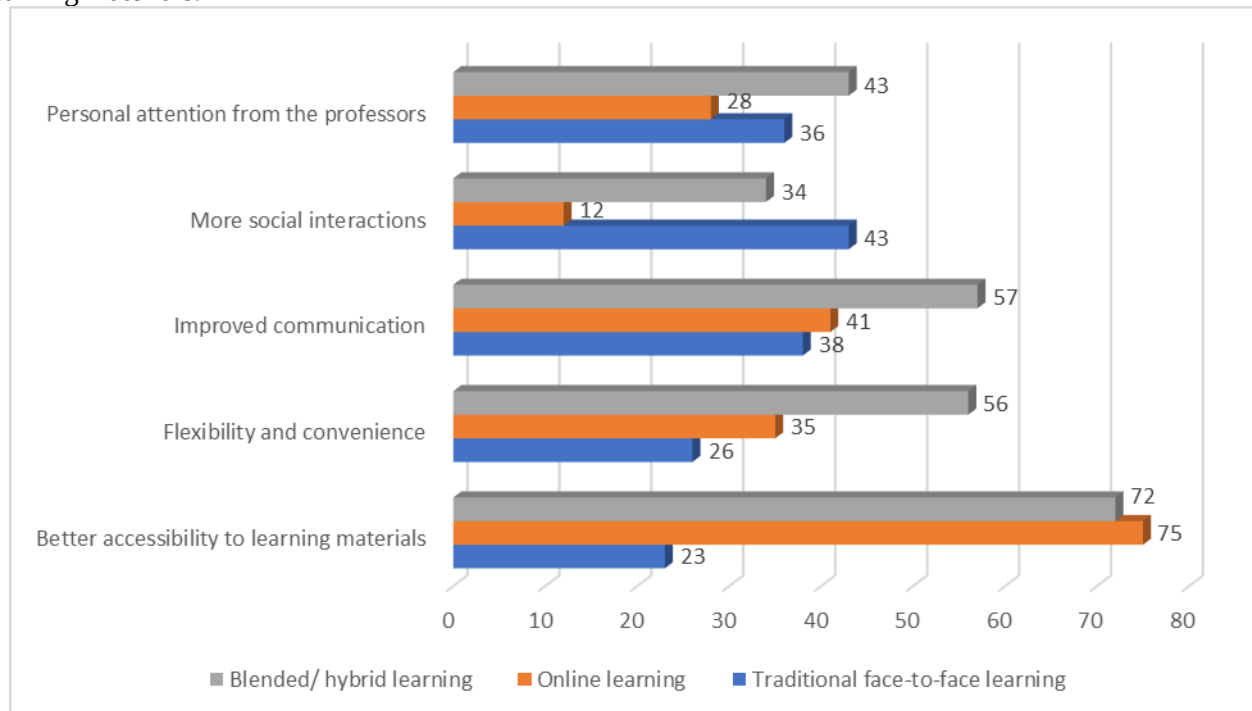


Fig. 9. Advantages of different forms of education (in %)

Source: Own research

"Which of the following technologies have you used in the training process?" is the next question, and again, the respondents have the opportunity to select more than one answer. Results reveal that Artificial Intelligence (AI) is the most familiar and the most used tool within the educational process and the implementation of various educational tasks. 61% of respondents claim that they used AI in their training process. Another 56% admit that gamification and Virtual reality (VR) are in the last position, with a share of 32%. Here, it is important to notice that 33% of respondents claim that they have never used such technologies in the educational process or in the performance of assigned tasks (Fig. 10). This percentage may be too high, especially considering AI's great progress in the last few years. Perhaps behind these data lies, to some extent, the uncertainty of using, for example, AI in the performance of a personal academic task. Considering the lively and still open discussion about the role of authorship and the role of artificial intelligence in such situations, it is quite possible that some of our respondents did withhold part of the truth, even though the survey was anonymous and voluntary.

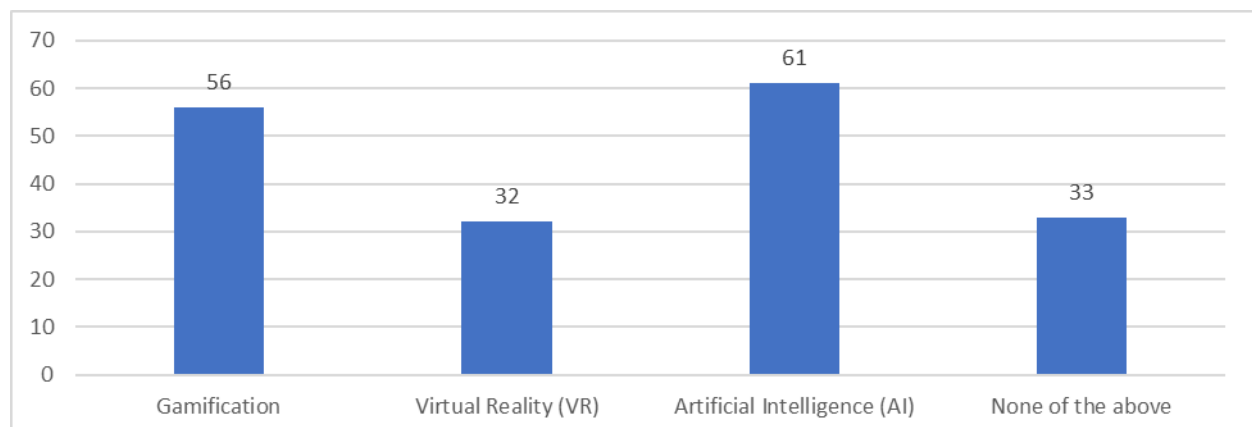


Fig. 10. Level of usage of new technologies in the learning process (in %)

Source: Own research

The next question is "How effective do you find gamification in improving the learning process?" (Fig. 11). The majority of responders (42%) find gamification a useful tool in the learning process as well and another 27% are even more convinced of its effectiveness. 14% could not give any suggestions, and 17% did not find any effectiveness that gamification could bring to the learning process.

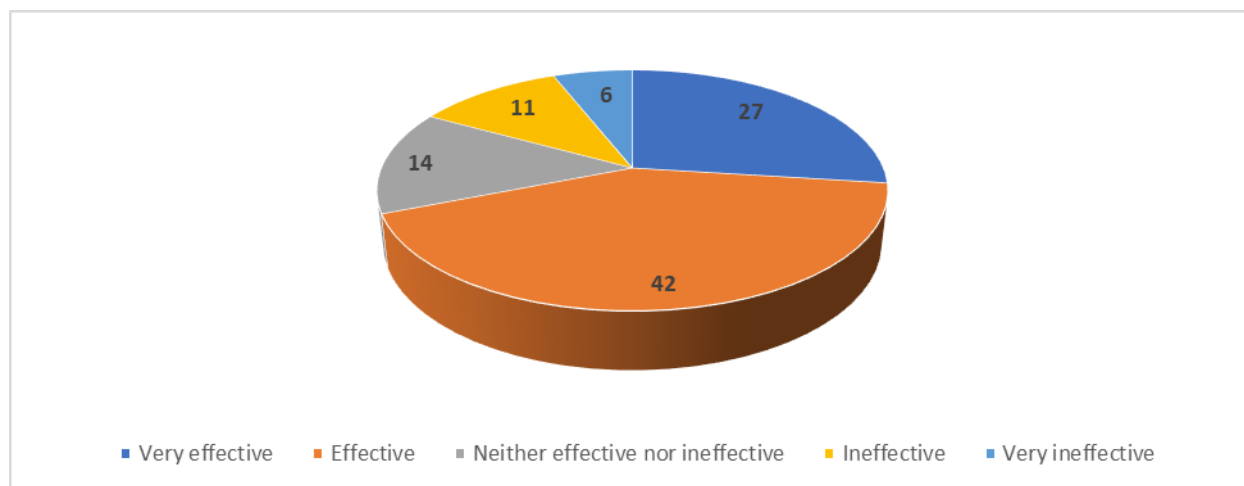


Fig. 11. Effectiveness of gamification in the learning process (in %)

Source: Own research

The next question is similar to the previous one, but this time Virtual reality (VR) is in focus: "How do you assess the possibility of using virtual reality in the learning process?" (Fig. 12). Here, the respondents are more convinced, and the VR meets a greater level of approval than gamification. 52% of respondents find VR useful in the learning process, with another 30% even more extreme in their positive opinion. This makes 82% of the respondents ultimately believe that VR can be a very useful tool through which other levels of knowledge of the studied subjects can be reached. Only 7% have a negative opinion on the usefulness of VR in the education process – the majority do believe in the benefits and advantages that VR can contribute to improving the quality of the academic process.

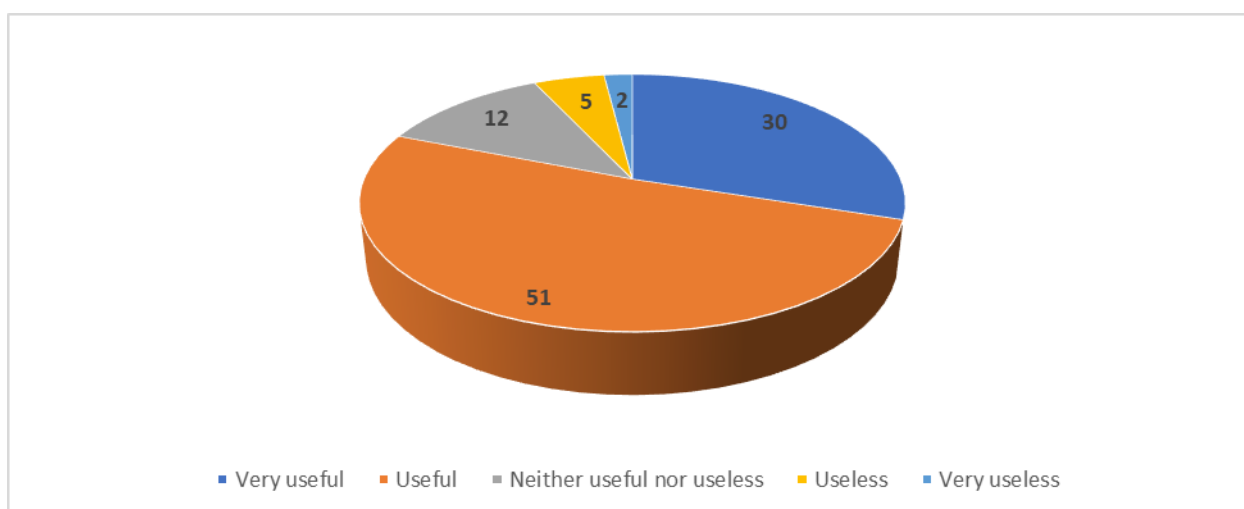


Fig. 12. Usefulness of Virtual reality in the learning process (in %)

Source: Own research

The next question logically is related to the AI in university learning process and reads as follows: "How do you rate the use of artificial intelligence to personalize the learning process?" (Fig. 13). Here again, we have a major share in positive spectrum – 55% in total of our responders find that AI is very useful (13%) as well as useful (42%). Unlike the previous two questions, however, here the share of people who chose the answer "neither useful nor useless" is significantly higher – 21% (in comparison - the share of those who answered in

this way regarding gamification is 14%, and that for virtual reality - 12%). This relatively large uncertainty in the respondents' answers can be attributed to the second part of the question, which specifies the usability of AI in terms of personalization of the learning process. Perhaps the respondents themselves currently do not have enough personal experience to judge whether AI would support the personalization of the learning process or not. In this sense, the next academic years will be indicative in this regard.

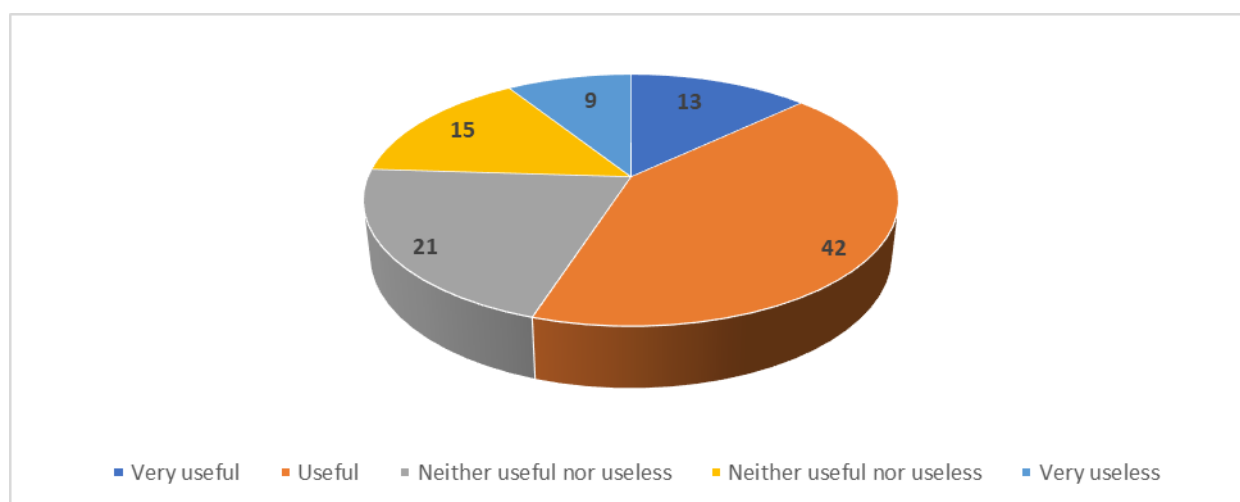


Fig. 13. Usefulness of AI for personalizing the learning process (in %)

Source: Own research

We try through the following questions to understand the perceptions of students and professors regarding the benefits and advantages that VR could bring to the learning process. The question is: "What do you think are the main advantages of using virtual reality in education? The respondents had the opportunity to choose multiple answers (Fig. 14).

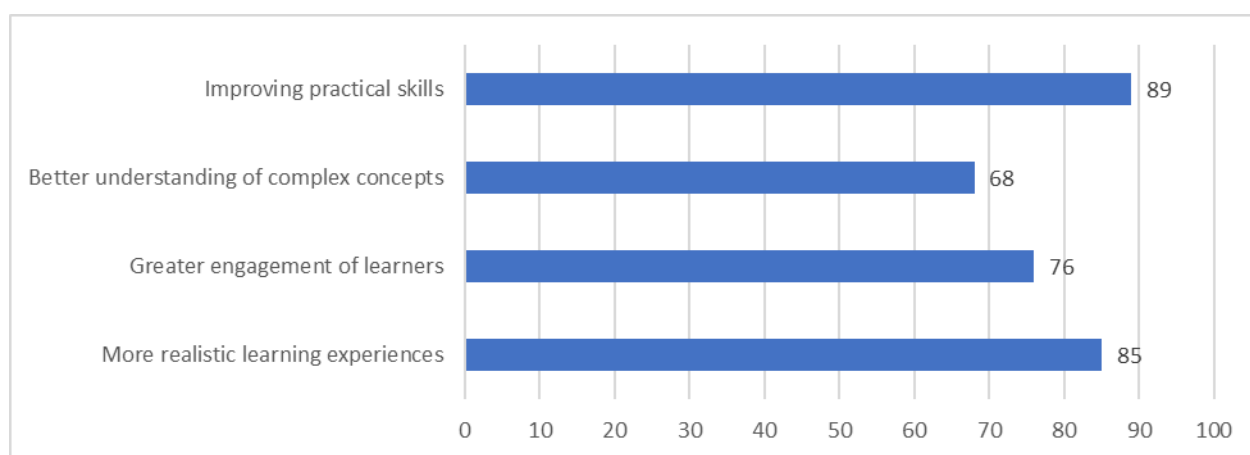


Fig. 14. Main advantages of VR in the learning process (in %)

Source: Own research

As can be seen from the figure above, all presented advantages are recognized and very well received by respondents, as they all scored over 65% approval. The opportunity to improve practical skills through VR was rated the highest, receiving 89% of respondents' votes. The next very strong benefit of using VR in the learning process, recognized by our respondents, is related to the possibility for students to receive more realistic learning experiences (85%). Next comes greater learner engagement, which can be obtained through VR, and with the lowest score (but still accepted by a large proportion of survey respondents) is the possibility of a better understanding of complex concepts with the use of VR (68%). In addition, the respondents also highlight the advantages of the usage of VR in the education process in the following directions: achieving experi-

ential learning, Low level of distraction, equal access to all (including for students with disability), possibility of instant assessment and real-time reaction and feedback, etc.

The next question is devoted to AI but is focused on its disadvantages: What do you think are the main disadvantages of using artificial intelligence in education? (Fig. 15).

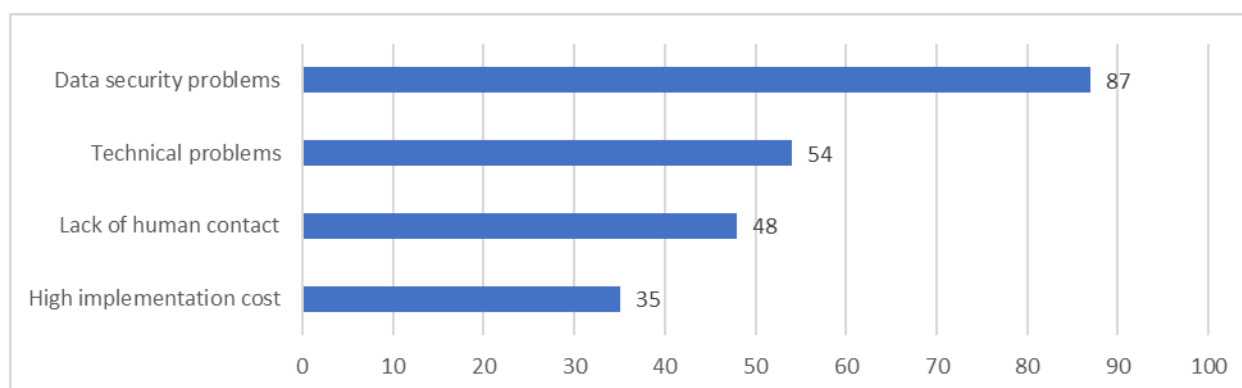


Fig. 15. Main disadvantages of using AI in the learning process (in %)

Source: Own research

As can be seen from the figure, the definitely high costs associated with the implementation of AI in the educational process is not recognized by a sufficiently large number of respondents as a serious drawback. Only 35% of respondents consider this to be a disadvantage. This result perhaps indirectly shows the desire and positive attitude of a large part of university students towards the possibility of using AI in the learning process. In this sense, for them, the value of the investment, no matter how large and significant it is, is justified from the point of view of effect and improvement of the quality of the educational process. The main drawback of implementing AI in the learning process is related to data security. 87% of respondents point to it and say it is the biggest challenge for AI-related learning objectives in university education courses. This problem and the trust of all must be solved before moving towards a stronger advocacy of AI in universities. According to our respondents, technical issues are the second most important drawback to AI in the learning process. Here their concerns, as with the previously commented shortcoming, are justified, and the educational institution itself should very carefully evaluate its available educational infrastructure, adapt it and only then implement AI to avoid such technical problems as much as possible. Almost half of respondents believe that the lack of human contact in AI is a problem, which is also the drawback rated with the fewest votes (48%). Considering that our main target group and respondents are representatives of a generation that grew up in the digital world, this one is not much on the agenda, especially compared to the other disadvantages mentioned.

“How easy is it for you to use technologies such as virtual reality and artificial intelligence in the learning process?” is the following question (Fig. 16). For the majority (51% in total), the usage of VR and AI in learning process is easy (33%) or very easy (18%), which once again provides further evidence that students expect new technologies to increasingly permeate their university studies. A total of 23% hold the opposite opinion, and another 26% believe that it is neither easy nor difficult to use new technologies such as AI and VR in the educational process at universities.

The last question aims to collect information about the general perception in evaluation that new technologies have on the motivation for learning. The question is, “How do you rate the overall impact of gamification, virtual reality and artificial intelligence on your motivation to learn?” (Fig. 17).

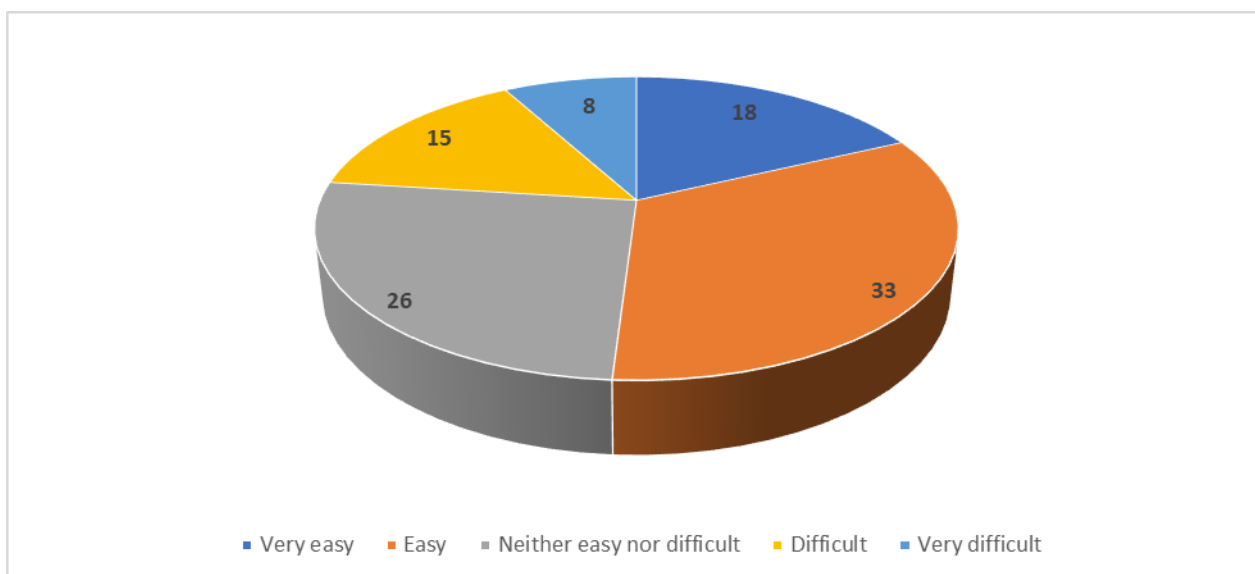


Fig. 16. Easiness in the usage of new technologies in the university learning process (in %)

Source: Own research

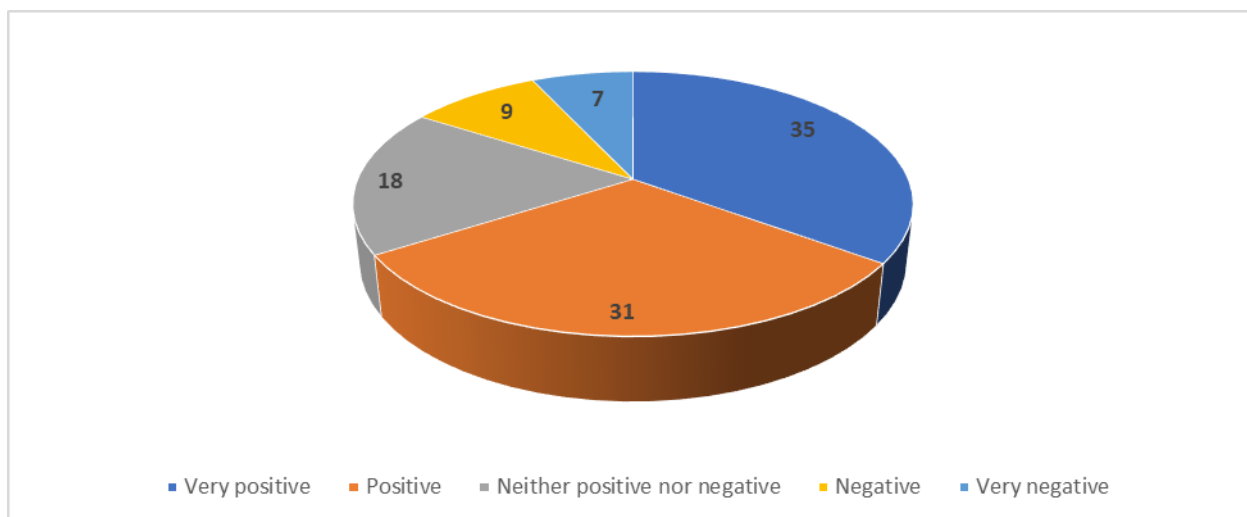


Fig. 17. Assessment of the relation between the usage of new technologies in university and learner motivation (in %)

Source: Own research

As seen in Figure 17, 66% of respondents are convinced that new technologies have a positive (31%) and even very positive (35%) impact on their motivation to learn. This result clearly proves the need for deeper integration of the new technologies in the educational process in universities. At the same time, only 16% of the total reported negative, and another 18% were not sure about the impact of new technologies on their motivation for learning.

5. Conclusion and recommendations

To meet the ever-increasing demands of students, universities are increasingly looking to the possibilities that new technologies provide. AI and VR are just some of the options that can be introduced into the university education process. Through the possibilities that new technologies can provide, some of the most serious challenges of the traditional learning process can be overcome - starting with improving the flexibility of the program and reaching an improved level of concentration, attention and motivation of students in class.

The results of this study strongly confirmed our initially defined hypotheses, namely that (first hypothesis) Students are willing to explore different learning tools and methods based on new technologies (such as virtu-

al reality, gamification, etc.) during their university classes and Second Hypothesis: Full-time students prefer blended/ hybrid learning process than only traditional face-to-face classes or fully online learning.

As evidence for the first hypothesis, 66% of respondents are convinced that new technologies have a positive (31%) and even very positive (35%) impact on their motivation to learn. This result clearly proves the need for deeper integration of the new technologies in the educational process in universities. In terms of concrete technologies, 69% in total (42% useful, 27% - very useful) find gamification as a useful tool in the learning process within the universities; VR meets a greater level of approval than gamification – 82% in total (52% useful and 30% very useful); 55% in total of our responders find that AI is useful (42% - useful and 13% - very useful). For the majority (51% in total) of respondents, the usage of VR and AI in the learning process is easy (33%) or very easy (18%), which once again provides further evidence that students expect new technologies to increasingly permeate their university studies.

As evidence for the second hypothesis, 47% of respondents prefer blended/ hybrid learning over traditional (41%) or online (12%). The blended/ hybrid learning process receives the most considerable acceptance for the following advantages: personal attention from the professors, improved communication, flexibility and convenience. Personal attention from the professors was recognized as an advantage of the blended educational process by 43% of respondents. In comparison, the traditional form of education here collects 36%, and online learning - only 28%.

The results of the present study unequivocally show the trends in the future development of universities and the possibilities for the integration of new technologies according to the expectations of today's students.

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