

## **TO BE OR NOT TO BE... EDUCATED DIGITALLY? THE CONCLUSIONS FROM THE TRANSFORMATION OF EDUCATIONAL PROCESS DURING COVID-19 – THE POINT OF VIEW OF THE UNIVERSITY PROFESSORS**

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**Abstract.** The current research presents the attitude of university professors to the rapid digital transformation of educational process during COVID-19. Learning process is not random mixture of different mechanical activities, contrariwise – it requires combine efforts both of lecturers and students with the possibility of direct communication, securing sharing of knowledge, skill and ability. The aim of the current research is to understand the opinion of the university professors on the online education and its impact both on students and lecturers. For this purpose we conduct a survey (n=434). Our results indicate that scholars are adamant that online classes require much more effort and self-preparation. At the same time results from the survey reveal the heavy workload of lecturer due to the lack of direct connection with audience. The university professors admit the greater intensity of the online education, but their concentration remains the same, despite the type of lecture – online or traditional.

*Keywords:* online education; digital transformation; COVID-19; universities

### **Introduction**

COVID-19 pandemic and restriction as a result of social isolation has had an almost irreversible impact on almost every aspect of our lives – both professional and personal. Universities and academic life are no exception. Higher education institutions were forced to rapid transformation of their educational process from traditional to online in an attempt to meet the challenges of the pandemic. This change was accompanied by high level of anxiety, coming from different directions – from the core technological and technical challenges to pure educational both for

professors and students. There were even speculations that the online education will outline the sunset of the traditional profession of university professors. The current study is dedicated to the opinion and assessment of the university professors for online education.

### **Literature review**

Undoubtedly, the COVID-19 pandemic turned our ideas about the functioning of the modern world, made us rethink basic understandings, including regarding restrictions related to personal freedom, in the name of protecting human health. There are many researches so far, devoted to COVID-19 and its impact on the different aspects of personal, social and business life. Our current is dedicated to the impact that COVID-19 had on the educational process especially in the universities and more specifically – on the rapid and to some extent irreversible digital transformation of tertiary education.

The impact that COVID-19 had on universities is very discussed and complex topic with various dimensions and projections.

### **Quality of online education in universities and level of satisfaction**

Arfaoui and Kammoun (2023) explore the specifics of accounting education during COVID-19. They conclude that one of the primary challenges disrupting online education is the insufficient technological tools and proficiency among both teachers and students when it comes to using digital platforms. This lack of familiarity often leads to difficulties in navigating online learning environments effectively. Additionally, slow internet connections and various other technical issues further compound these challenges, hindering the seamless delivery and participation in online classes. Bruggeman et al. (2022) reveal that the tension of university teachers for online education during COVID-19 varies between enthusiasm and stress. Scholars provided survey with focus groups of university lecturers and outlined 6 areas of tension: connection with students; relations with colleagues; digital opportunities and threats for students during online study courses; different changes of the lecturer role; time pressure; support issues. Hamdan et al. (2021) explore the students' attitude to online education during pandemic crisis. They admit that the mean score of the students' satisfaction was relatively low. In terms of student interaction in online education, research found that learner-instructor interaction received the highest average score, indicating that students valued engagement with their instructors the most. Following this, learner-learner interaction received the second-highest score, suggesting the importance of peer interaction in online learning environments. However, learner-content interaction received the lowest average score, indicating a need for improvement in how students interact with the course material (ibid). Dong et al. (2024) argue that according to their research, students experienced higher levels of anxiety and depression when engaged in

online education compared to previous studies focusing on traditional teaching methods. On the contrary opinion are Salman and Soliman (2022) who studied the perception of students from the Egyptian higher education. Their study discovered positive satisfaction levels with online education, as well as favorable perceptions regarding university support, instructor-student communication, and course design. However, perceptions towards peer collaborations and student initiative were less positive, admit also scholars.

Choi, Robb, Mifli and Zainuddin (2021) also studied the university students' perceptions to online learning during pandemic and admit that in order to ensure the effectiveness of online learning, it's important to incorporate blended education approaches, combining online and traditional in-person instruction. This blended approach enhances the learning experience by providing students with a diverse range of learning opportunities and resources. Their research findings highlight that effective communication between lecturers and students is crucial for the success of online learning. This communication facilitates engagement, clarification of concepts, and provides necessary support, all of which are vital for student achievement in online courses (ibid). Almost the same conclusion has been reached by other scientists who explored the specifics in online education in Architecture. Asfour and Alkharoubi (2023) conducted a research among university students on their assessment of online education. According to their findings, students expressed satisfaction with their online learning experience during the pandemic. However, they highlighted a significant challenge: the absence of physical interaction, particularly in studio-based architecture courses, leading to feelings of isolation. As a result, they suggest that online education in architecture should complement traditional methods rather than replace them entirely. Specifically, design studio courses, especially at the beginning of a programme, should not be solely conducted online unless absolutely necessary. Instead, employing a blended learning approach is recommended according to scientists. This approach combines interactive online technologies with traditional face-to-face instruction, striking a balance that enhances the learning experience in design studio courses (ibid).

### **The technological infrastructure and further developments**

Technological infrastructure and the state of play of the universities in pure technological point of view is also one of the important aspects when we consider the online education process and digitalization in higher education. Abbas, Ar and Hosseini (2024) admit that the role of government play a critical role in this process. Their research highlights the crucial role of governments in shaping policies related to faculty development programs, funding allocation, administrative support, and infrastructure enhancement, particularly in the context of digital education during health crises. It emphasizes the necessity of initiatives aimed at upgrading existing information technology infrastructure and establishing new digital platforms.

These efforts are essential not only for mitigating health risks but also for ensuring effective learning outcomes through digital channels during challenging times (ibid). At the same time for Evans, Miklosik and Du (2023) it is the strong connection between industry and university that drives forward the digitization capabilities of universities. Cui et al. (2023) pay attention on the online education and big data. Amid the efforts to prevent and control the spread of COVID-19, there has been a rapid growth in innovative online education, leading to the emergence of numerous new learning approaches. Authors admit that utilizing big data spanning across different times and locations has presented a practical solution for advancing virtual online teaching methods. Given the backdrop of the COVID-19 pandemic, large-scale online teaching has emerged as a prevalent and notable feature of internet-based education. The integration of online teaching with big data technology has now become the primary mode of education delivery during the epidemic. Augmented Reality (AR) and Virtual Reality (VR) are also put in online educational practice. In this line of consideration, Tiwari, Bhaskar and Pal (2023) argue that AR and VR have proven to be valuable tools in enhancing teaching across multiple disciplines such as engineering, medicine, nursing, and chemistry. Furthermore, their research suggests that AR and VR technologies have versatile applications in teaching various subjects and specialties. Additionally, they can be effectively employed in other aspects of online education, including admissions processes, virtual industry visits, training sessions, internationalization efforts, and developing specific courses tailored for students with disabilities (ibid). Malik et al. (2023) introduce a machine learning method aimed at forecasting students' adaptability levels in online entrepreneurship education. Ibarra-Vazquez, Ramírez-Montoya, Buenestado-Fernández and Olague (2023) also explore the possibility of utilizing machine learning techniques in anticipating the proficiency level in open education.

### **Digital transformation as a challenge for management, students and professors**

Anggadwita, Indarti and Ratten (2024) study the educational practice in Indonesian private universities in terms of change. They argue that many educators encountered difficulties during the shift to online learning and recognized that these changes would persist beyond the COVID-19 era. Within this context, authors outlined two critical factors influencing readiness to navigate change: adaptability and proactive engagement, along with innovative approaches to education. These elements are pivotal in comprehending and effectively responding to the digital transformation brought about by the COVID-19 pandemic (Anggadwita, Indarti and Ratten 2024). Dei et al. (2023) explore the change in management strategy of some universities in Ghana during the pandemic. According to their findings, several strategies have been implemented, including shifting to digital learning platforms such as Zoom, Loom, Microsoft Teams, and Google Meet. Additionally,

an enrollment command center has been established to manage and support decision-making processes concerning student access, recruitment, admission, persistence, retention, and completion throughout the COVID-19 pandemic and beyond. Furthermore, virtual tour services have been enhanced, allowing for improved navigation and access to university facilities through online platforms (Dei et al. 2023). Hakkarainen, Salminen, Alastalo and Virtanen (2024) focused on the online programmes in nurse education. According to them, these programmes play a significant role in enhancing pedagogy by offering students a satisfactory work-life balance, fostering a sense of community and support, providing engaging digital content, and utilizing diverse teaching methods by faculty members. The findings of their research suggest that educators should focus on developing and implementing strategies to enhance digital learning environments with pedagogical approaches that prioritize community building, thus catering to the individual needs of students (Hakkarainen, Salminen, Alastalo and Virtanen 2024). Gamification is another aspect and possibility directly created from the digitization. Tan and Cheah (2021) propose to use gamified AI-based online application in order to improve students' perception towards physics. Xin and Ma (2023) studied the opportunities created by gamification in online entrepreneurship education and its impact on the digital entrepreneurial intentions of university students. Scholars claim that incorporating gamification into online entrepreneurship education can directly impact digital entrepreneurial intention. However, they also admit that digital policy understanding and digital entrepreneurial self-efficacy serve as mediators between gamified online entrepreneurship education and digital entrepreneurial intention. Also in the field of online entrepreneurship education, Tseng, Wu, Lian and Zhuang (2023) explored the role of platform for the positive reactions of learners. Their findings revealed that factors such as instructional support, instructor enthusiasm, and instructor preparedness significantly influence learners' perception of the value derived from using online learning platforms for acquiring internet entrepreneurship knowledge and skills. This perceived value, in turn, positively impacts learners' intention to reuse these platforms. Additionally, the scholars admit that the intention to reuse online learning platforms positively correlates with positive reactions from learners. Interestingly, the connection between value and intention is stronger in free platforms compared to paid ones (ibid). Fernández-Batanero, Montenegro-Rueda, Fernández-Cerero and Tadeu (2022) admit that institutions in tertiary education level ought to allocate greater resources towards enhancing online education platforms and refining faculty training programmes relevant to the online education.

Sakellari et al. (2024) pay attention on the digital health literacy and the way that university students look for the specific information on the internet (for instance for COVID-19) and interpret it. The findings from their study underscore the importance of enhancing digital health literacy among university students.

This suggests a necessity for health education interventions to focus on improving students' abilities to seek out reliable health information and cultivate critical thinking skills in evaluating such information.

### **The future dimensions of the universities**

When we consider the digitization and possibilities offering by the rapid development of new technologies, the invasion of Artificial Intelligence (AI) etc., the reasonable continuation is the question what will be the possible future of the universities. For Mairal (2022) the future of universities is in absolutely close connection with the technology development and AI. At the same author points out that the future university should prioritize excellence by taking significant and decisive steps towards inclusion, revising hiring practices, and broadening international opportunities for all stakeholders. For Chiu (2024) the future transformation in higher education will be driven by generative AI (GAI). Author admits that preparing students for the workforce in a society driven by Generative Artificial Intelligence, future higher education needs a transformation. This transformation involves introducing new learning objectives, such as proficiency in utilizing and teaching with GAI, as well as developing AI literacy. Additionally, there's a strong emphasis on interdisciplinary learning and maker education, where students engage in hands-on activities within class settings. The researcher also proposes assessment methods to focus on both in-class participation and practical application of skills (ibid). According to Moorhouse, Yeo and Wan (2023) Higher Education Institutions have acknowledged the integration of GAI and have formulated assessment guidelines to guide academic and administrative staff on its implementation. Authors posit that embracing GAI as a component of the assessment process can be advantageous, given its prevalence in today's educational and professional environments. This shift necessitates instructors to cultivate a new skillset – proficiency in generative artificial intelligence assessment literacy (ibid).

Lima et al. (2023) reveal that sustainability could be reached by public universities through lean evaluation and further improvements of different administrative processes. For Rotondo, Giovanelli and Ezza (2023) the key factor for sustainability of university is the capability of implementing sustainable innovation. Agarwal (2023) adds to all this and the smart initiatives for the future development of the universities. At the same time the formula for sustainability for Nazneen et al. (2023) is the skillful combination between social responsibility and knowledge sharing. Interesting methods, approaches and ideas are also proposed by Tolentino, Shtele, Messori and Perotto (2024); Baneliene (2021); Schubert, Kroll and Chavez (2023); Stoyanova and Boyanov (2022).

For summarizing all presented so far from the literature review, we will share the opinion of the Hurajova, Kollarova and Huraj (2022), who admit the pivotal

role of digitalization of educational process for securing the sustainability of the universities. They admit that in times of crisis, such as emergencies or disruptions, modern online technologies play a crucial role in ensuring the continuity and sustainability of the educational process. These technologies offer various tools and platforms that enable universities to adapt and continue delivering quality education remotely. As a result, they are increasingly becoming an indispensable component of university education, offering flexibility and accessibility to both students and educators. This shift towards online education not only helps maintain educational continuity during emergencies but also fosters innovation in teaching and learning methods, making education more adaptable and resilient in the face of unforeseen challenges.

### **Methodology of the research**

The current research is devoted directly to the attitude and assessment of the university professors to the quality of online education, provided during Covid-19 pandemic. The survey was conducted in two steps during the two big lockdowns in Bulgaria. Due to the restrictions of social isolation, the questionnaire was in Google forms format and link to the questionnaire was provided via e-mail to all potential respondents. For this purpose, our preparational work was time-consuming, due to the fact that we collect mechanically the e-mails of university professors through the information of websites of the university. The email with which we sent the questionnaire contained comprehensive information about the core scientific objectives of the study, details about the team behind this initiative, and last but not least, that participation in the study was absolutely voluntary, respecting the anonymity of the respondents. We sent the questionnaire to almost 1240 university professors from different Bulgarian universities and as a result of these efforts we received 434 answers, which makes exactly 35% from the initial reached colleagues.

### **Results and analysis**

The questionnaire is separated in two main parts, first one collects general information about the profile of the respondents and second one – the technological infrastructure and specifics of online education during COVID-19.

First question was dedicated to the gender of our responders. The results show slight predominance of females' respondents. From all 434 participants in survey, 52,5% are females (or 228) and 47,5% are males (or 206 persons). This result could be considered as relevant for the specifics of the Bulgarian labor market in Higher education and partly the idea, that usually women are more sensitive and open to others, including open to the colleagues' surveys.

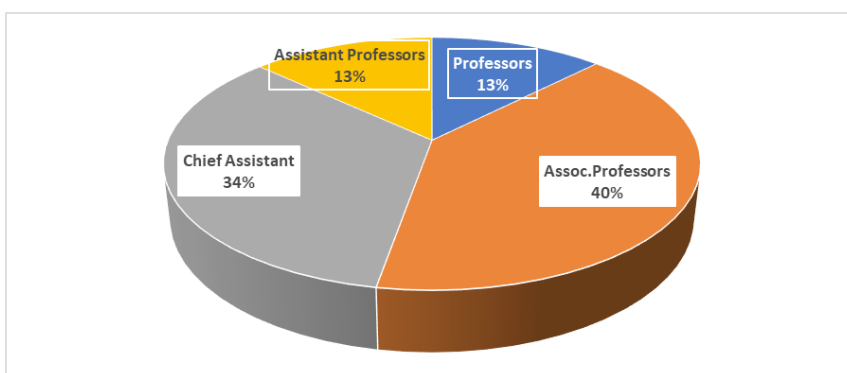
Second question was with open answer and the respondents were asked to enter the name of the university where they work. The achieved results are presented in Table 1.

**Table 1.** Workplace/university of the respondents, arranged alphabetically

| <b>N</b> | <b>Name of the university</b>  | <b>Number of participating respondents in survey</b> |
|----------|--|--|
| 1        | Academy of Music, Dance and Fine Arts "Prof. Asen Diamandiev" –Plovdiv | 2  |
| 2        | American University in Bulgaria  | 5  |
| 3        | "Angel Kanchev" University of Ruse                                     | 8  |
| 4        | "Dimitar A. Tsenov" Academy of Economics                               | 3  |
| 5        | "G.S.Rakovski" National Defense College                                | 3  |
| 6        | International Business School  | 1  |
| 7        | "Konstantin Preslavsky" University of Shumen                           | 19   |
| 8        | National Academy of Art – Sofia  | 5  |
| 9        | National Military University "Vasil Levski"                            | 9  |
| 10       | National Musical Academy   | 1  |
| 11       | New Bulgarian University   | 41   |
| 12       | "Nikola Vaptsarov" Naval Academy                                       | 1  |
| 13       | "Paisii Hilendarski" University of Plovdiv                             | 4  |
| 14       | Sofia University "St. Kliment Ohridski"                                | 47   |
| 15       | South-West University "Neofit Rilski"                                  | 14   |
| 16       | Technical University – Sofia   | 25   |
| 17       | Technical University – Varna   | 39   |
| 18       | "Todor Kableshkov" University of Transport                             | 1  |
| 19       | Trakia University – Stara Zagora                                       | 3  |
| 20       | University of Agribusiness and Rural Development                       | 2  |
| 21       | University of Architecture, Civil Engineering and Geodesy              | 25   |
| 22       | University of Chemical Technology and Metallurgy                       | 22   |
| 23       | University of Food Technology – Plovdiv                                | 1  |
| 24       | University of Forestry   | 14   |
| 25       | University of Economics – Varna  | 35   |
| 26       | University of Library Studies and Information Technologies             | 1  |
| 27       | University of Mining and Geology "St. Ivan Rilski"                     | 37   |
| 28       | University of National and World Economy                               | 25   |
| 29       | University of Telecommunications and Posts                             | 7  |
| 30       | University "Prof. d-r Assen Zlatarov" – Burgas                         | 5  |
| 31       | Varna Free University „Chernorizets Hrabar“                            | 11   |
| 32       | Veliko Tarnovo University "St.St. Kiril I Metodii"                     | 18   |
|          | <b>Total</b>   | <b>434</b>   |

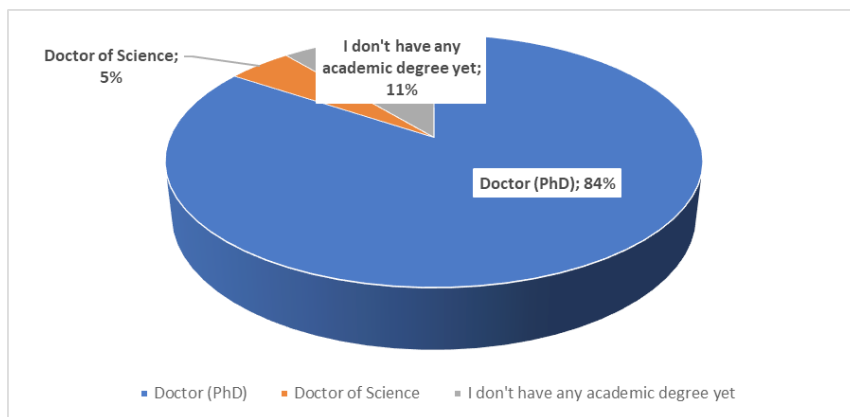
According to the information of the website of the National Evaluation and Accreditation Agency within the Bulgarian Council of Ministers which is responsible for the accreditation of the HEIs in Bulgaria, in 2024 there are 50 HEIs which have valid accreditation to provide such type of education (both private and public). Therefore, our survey covers the major part of universities in Bulgaria which could be considered as good and relevant level of collected information from our target group. In terms of location of universities, we have 13 universities located in Sofia and the rest 19 universities in different other cities (Varna, Plovdiv, Burgas, Ruse, Stara Zagora, Blagoevgrad, Veliko Tarnovo, Shumen, Svishtov) in the country. This fact makes more relevant the achieved and analyzed results at national level. As the type of financing of the universities is concerned, the survey includes both types – private and public in relation 4 to 28. Again, this relation reflects the situation in Bulgaria, where the major part of the universities is public.

Next question collects information about the academic position of the respondents. The results are presented in fig.1. According to the national system for academic staff, the first level is the position of Assistant Professors, which are represented with share of 13% (or 57 persons). The next step in academic hierarchy is the position of Chief Assistant, which are represented with share of 34% (or 148 persons). The next position in academic hierarchy is this of Associated Professors, which in our survey has the biggest share of 40% (or 175 persons). On the top of this hierarchy are Professors with share of almost 13% (or 54 persons - almost the same number as the Assistants). If we combine the number of the two assistant positions and the two positions of the habilitated position we will achieve 205 assistant staff and 229 habilitated academic staff which fact does not give any privilege to concrete sub-group. Therefore, the opinion of all academic positions is well represented in our survey.



**Figure 1.** Academic position of the respondents

Next question collects information on the highest academic degree obtained by the respondents (fig.2). As it can be seen from the figure below, the impressive part of our responders has PhD degree (366 persons) which is easily explicable situation. According to the requirements laid down in the Bulgarian legislation, in order to take up the positions of Chief Assistant, Associate Professor and Professor, it is mandatory to have a scientific title of doctor (PhD). Therefore, the fact that 84% of the respondents of the survey have PhD degree is the evidence, that Bulgarian universities followed the legislation.

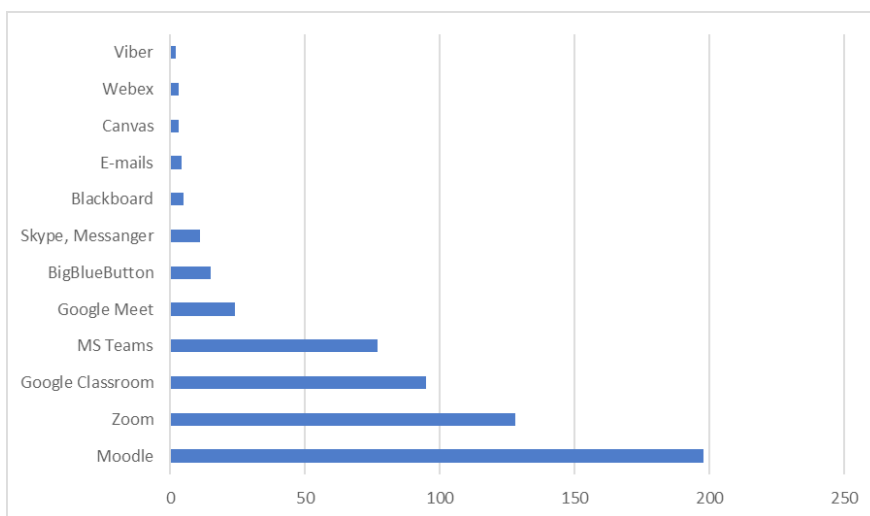


**Figure 2.** Type of the scientific title of the respondents

As the platforms used for the online education during COVID-19 pandemic are concerned, the university professors were asked to write the most common used tool for online lecturers and seminars. Here the variety of answers is obvious, but we can nevertheless distinguish some of the most commonly used platforms. The top five of the most used platforms are: Moodle, Zoom, Google Classroom; MS Teams, Google Meet. Among other relatively popular platforms also are BigBlue-Button, Skype, Messenger, Blackboard etc. On the other hand, there are respondents, who admit that use e-mails, web-page and intranet pages of the faculty and department, social media etc.

When we explore this specific topic, we also have to take into consideration the fact that in Bulgaria especially for the tertiary education institutions, there was no special requirement how exactly to be organized the online education, unlike all other types of education. This is the reason why some universities (such as University of National and World Economy, which is the biggest university in Bulgaria in terms of number of students) developed specific guideline for organize the education online process during pandemic, based on the use of MS Teams, which was

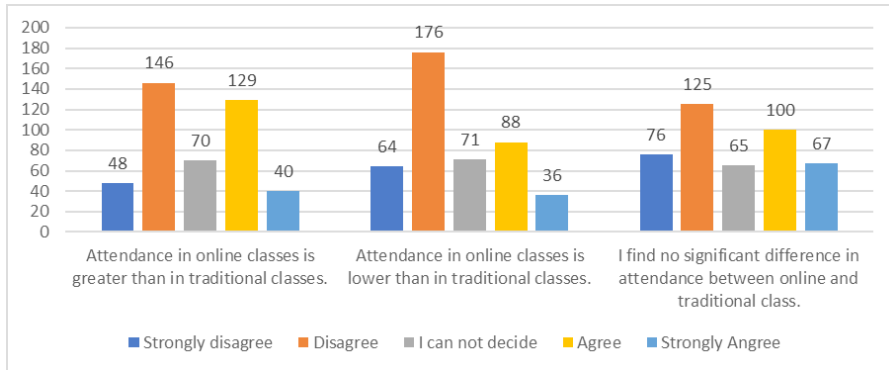
obligatory for all. On the other hand, there were universities that left the decision of how to conduct online learning to the personal judgment of the faculty, department or the lecturer himself (for instance the most oldest university in Bulgaria Sofia University “St. Kliment Ohridski” and Technical University-Sofia, which is the largest technical university in the country).



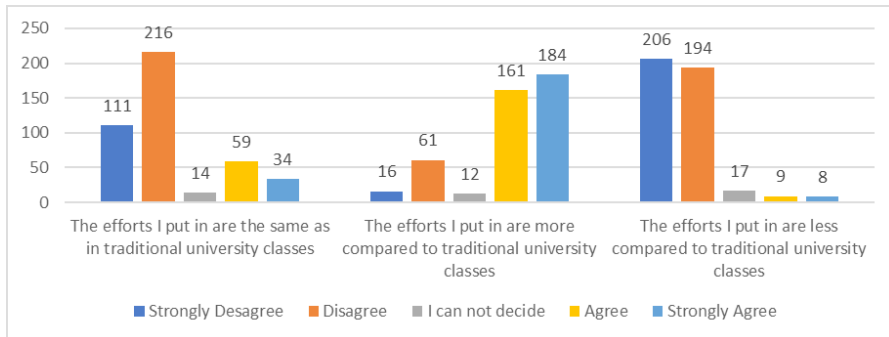
**Figure 3.** Used Platform for online education during COVID-19

The next part of the questionnaire collects information about the personal assessment of the respondents in different aspects of the online education during crisis. The questions were structured as different statements and the respondents were asked to choose the answers among 5-point Likert scale the most appropriate response according to their opinion.

The first variation of statements was in the file of attendance in online classes. The results are presented in fig. 4. As it can be seen from the figure below, the picture for the attendance in online classes remains vague. The majority of the respondents disagree on the statement that attendance in online classes is greater than traditional, but at the same time, the major part of the respondents also disagrees to the statement claiming that the attendance in online classes is lower than the traditional. The situation remains the same for the third statement which leads to the conclusion, that in different universities in Bulgaria, due to the different organization and requirements both to university professors and students, the results for the attendance vary.



**Figure 4.** Attendance in online classes – opinion of respondents

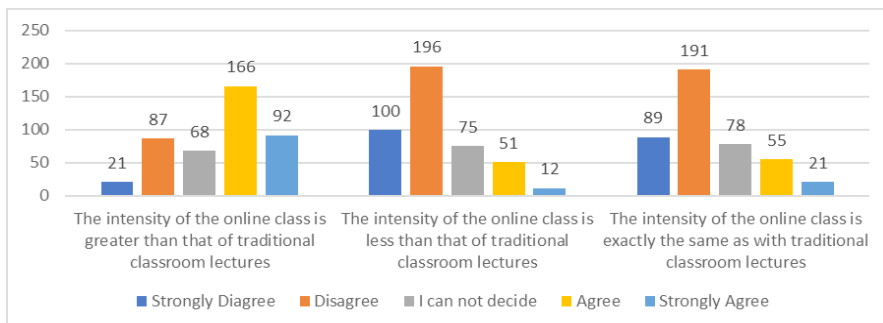


**Figure 5.** Efforts of university professors in online courses

The next question (fig.5) reveal very coherent opinion among university professors that the efforts they put in online classes are more, compared to traditional classes. Here there is no differences between the three statements – scholars are adamant that online classes require much more effort and self-preparation.

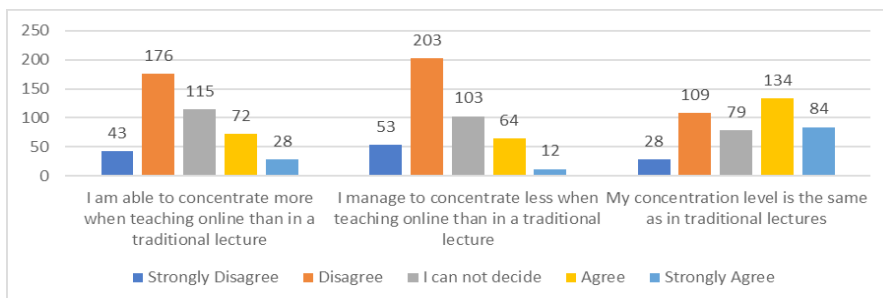
The question of effort if followed by the question concerning the intensity/workload of the online lecture comparing to the traditional one. Here the situation is not so clear than results achieved in the previous question, but nevertheless some analysis and conclusion could be made (fig.6). Here the level of people who cannot decide is relatively high in all three statement. At the same time, having in mind the two stages of disagreement, the second statement achieves high level – 296 in total. This means that the major part of our respondents (almost 70%) disagree with the claimant that the intensity of online classes is less than traditional form of education. In parallel with this, the first statement collects approval of the almost 60% of respondents. This opinion of the university professors in fact outlines one of the

major challenges in online classes – heavy workload of lecturer due to the lack of direct connection with audience. The lack of direct contact with the audience plays a critical role and practically makes it almost impossible for speakers to adapt and react to the general attitude of the audience.



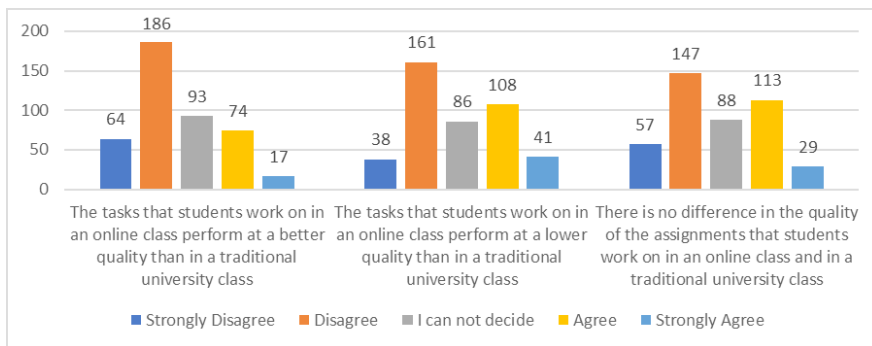
**Figure 6.** Intensity of online classes for the lecturers

Now that we've explored the effort and intensity of online learning, it's time to focus on the concentration of lecturers. The next question is devoted namely to concentration (fig. 7). It is noteworthy that the level of uncertainty remains relatively high (between 115 – 179), similar to the responses to the previous sets of statements. At the same time the first two statements here collect negative major group of respondents (219 in total for the first statement or exactly 50% and 256 in total for the second statement with the share of almost 60%). It is noteworthy that the level of uncertainty remains relatively high, similar to the responses to the previous sets of statements, although there is a slight preponderance of positive responses. Therefore, in terms of concentration, according to self-assessment of the lecturer, they believe that their concentration remains the same, regardless of the form of training - whether it is online or conducted in a traditional way.



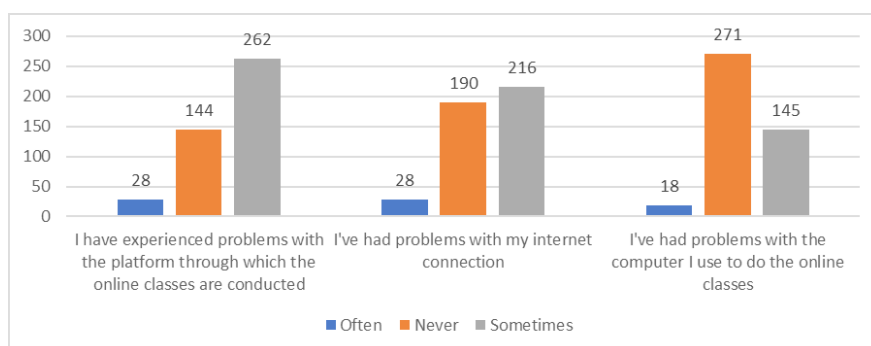
**Figure 7.** Level of lecturer's concentration

Opinion of the university professors for the quality of students work in online classes is presented on the fig. 8. The biggest level of disapproval collects here the first statement claiming that students work in online classes is better than traditional. 58% of respondents disagree, but at the same time 49% of respondents disagree to the opposite statement – that the quality of students work in online classes is lower than traditional. Perhaps this contradiction is due to the fact that our respondents are lecturers from totally different university and cover wide variety of fields – from technical to humanitarian as well as artistic, which may largely give rise to the heterogeneity of responses that was obtained in this set of questions.



**Figure 8.** Assessment of the university professors on the quality of students' work in online classes

The final question of this format is related to the assessment of the technical parameters of online classes. The greatest certainty was obtained regarding the computers used by the professors to conduct online classes. 62% of respondents said they never had technical problems with the computer they use for online classes. At the same time 262 persons (or 60%) admit sometimes had technical problems with the platform for online classes. The problem with the Internet connection as other barrier in front of effective online class is recognized by 216 persons (or almost 50%) – they admit that sometimes had technical problem due to the internet connectivity, while 190 respondents (or 44%) claim that they never had such type of problem.



**Figure 9.** Assessment of the technical parameters of online classes

Finally, the respondents were asked in open question to write up to three strengths and up to three weaknesses of online education. Here the variety of answers was absolutely huge, but nevertheless it could be outlined the most comment answers (table 2).

**Table 2.** Strengths and weaknesses of online university classes

| Strengths  | Weaknesses  |
|--|---|
| Better time management   | Lack of direct contact and communication with students. There is no way to monitor the reaction of learners and react to attention and inattention, understanding and misunderstanding. |
| Flexibility  | Lack of adequate feedback; some teaching methods are inapplicable in the absence of personal presence.  |
| Opportunities for innovative forms of work and tasks. Closer to the real work environment.   | Lacks social contact; students' concentration and activity are lower; it is difficult to organize teamwork; exam tests are copied   |
| Free access to classroom resources at any time.  | Strong dependence of training on the quality of the Internet connection and electricity   |
| Better organization and monitoring of activities related to the assignment and assessment of homework and control work.  | Formal presence of some of the university students.   |
| Working with an electronic platform facilitates the organization/traceability of the learning process in terms of attendance/participation/performance of assigned tasks by students | Fatigue due to long periods of time in front of the computer and exposure to radiation.   |

|   |  |
|---|--|
| A recording of the lecture/exercise can be made and later played back repeatedly by the student. When sharing a screen, the images shown to students do not change in quality (when using a projector in an auditorium, very often the image changes both in color and in resolution) | Student and academic life is becoming difficult and practically dying                          |
| Variety of topics and content of the study material   | The work that goes into preparing a synchronous class is at least twice as much as traditional |

### **Conclusion**

The aim of the current research was to understand the opinion of the university professors on the online education and its impact both on students and lecturers. For this purpose, we conduct an online survey (n=434). Our results indicate that scholars are adamant that online classes require much more effort and self-preparation. At the same time results from the survey reveal the heavy workload of lecturer due to the lack of direct connection with audience. The university professors admit the greater intensity of the online education, but their concentration remains the same, despite the type of lecture – online or traditional.

Some of the biggest strengths of online education, outlined by the respondents are better time management; adaptability of the learning process; opportunities for innovative forms of work and tasks, that are closer to the real work environment. At the same time some of the biggest weaknesses of online education are as follows: Lack of direct contact and communication with students and therefore – lack of adequate feedback. Difficulties for organizing team working; strong dependence of training on the quality of the Internet connection and electricity; formal presence of some of the university students.

In summary, the new technologies and digitization of education process give all university new perspectives for development. In this policy university professors play a key role and from their willingness and motivation depends the success of the university. Key understanding is to provide skillful blended education, adapted to the needs both of educators and students.

## REFERENCES

- ABBAS, A., AR, A. Y. & HOSSEINI, S., 2024. A global perspective of government initiatives to support higher education during the COVID-19 pandemic: A systematic review of literature, *Research in Globalization*, vol. 8. Available from: <https://doi.org/10.1016/j.resglo.2024.100202>. ISSN 2590-051X,
- AGARWAL, S. M., 2023. Go-Brown, Go-Green and smart initiatives implemented by the University of Delhi for environmental sustainability towards futuristic smart universities: Observational study. *Heliyon*, vol. 9, no. 3. Available from: <https://doi.org/10.1016/j.heliyon.2023.e13909>. ISSN 2405-8440.
- ANGGADWITA, G.; INDARTI, N. & RATTEN, V., 2024. Changes in Indonesian private universities educational practices in the post COVID-19 environment, *The International Journal of Management Education*, vol. 22, no. 1. Available from: <https://doi.org/10.1016/j.ijme.2023.100905>. ISSN 1472-8117.
- ARFAOUI, F. & KAMMOUN, I., 2023. Did accounting education remain resistant to digitalization during COVID-19? An exploratory study in the Tunisian context. *Journal of Accounting Education*, vol. 65. Available from: <https://doi.org/10.1016/j.jaccedu.2023.100874>. ISSN 0748-5751.
- ASFOUR, O. S. & ALKHAROUBI, A. M., 2023. Challenges and opportunities in online education in Architecture: Lessons learned for Post-Pandemic education. *Ain Shams Engineering Journal*, vol. 14, no. 9. Available from: <https://doi.org/10.1016/j.asej.2023.102131>. ISSN 2090-4479.
- BANELIENÉ R., 2021. Sustainable economic growth in the European Union under COVID-19 conditions. Paris Sorbonne Business School, France (virtual conference). *Academy of Innovation, Entrepreneurship and Knowledge (ACIEK)*, pp. 41 – 42, ISBN 9788409301782.
- BRUGGEMAN, B.; GARONE, A.; STRUYVEN, K.; PYNOO, B. & TONDEUR, J., 2022. Exploring university teachers' online education during COVID-19: Tensions between enthusiasm and stress. *Computers and Education Open*, vol. 3. Available from: <https://doi.org/10.1016/j.caeo.2022.100095>. ISSN 2666-5573.
- CHIU, T.K.F., 2024. Future research recommendations for transforming higher education with generative AI. *Computers and Education: Artificial Intelligence*, vol. 6, Available from: <https://doi.org/10.1016/j.caeai.2023.100197>. ISSN 2666-920X.
- CHOI, J.-J.; ROBB, C. A.; MIFLI, M. & ZAINUDDIN, Z., 2021. University students perception to online class delivery methods during the COVID-19 pandemic: A focus on hospitality education in Korea and Malaysia. *Journal of Hospitality, Leisure, Sport & Tourism Education*, vol. 29. Available from: <https://doi.org/10.1016/j.jhlste.2021.100336>. ISSN 1473-8376.
- CUI, Y.; MA, Z. ; WANG, L. ; YANG, A. ; LIU, Q. ; KONG, S. & WANG, H., 2023. A survey on big data-enabled innovative online education systems during

- the COVID-19 pandemic. *Journal of Innovation & Knowledge*, vol. 8, no. 1. Available from: <https://doi.org/10.1016/j.jik.2022.100295>. ISSN 2444-569X.
- DEI, D.-G. J.; KANKAM, P.; ANANE-DONKOR, L.; PEASAH, T. E. & PUTTICK, C. P., 2023. Strategies for enrolment management in private universities in Ghana during the COVID-19 pandemic. *International Journal of Educational Research Open*, vol. 5. Available from: <https://doi.org/10.1016/j.ijedro.2023.100294>. ISSN 2666-3740.
- DONG, J.; HE, Y.; JIANG, F.; LIU, Z.; NI, Y.; TANG, Y.; LUO, J.; ZHANG, Z. & HUANG, Y., 2024. Teacher-student relationships and mental disorders of undergraduate and graduate students in online education: A moderated mediation model of mobile phone addiction and hometown setting; *Computers in Human Behavior Reports*. Available from: <https://doi.org/10.1016/j.chbr.2024.100406>. ISSN 2451-9588.
- EVANS, N.; MIKLOSIK, A. & DU, J. T., 2023. University-industry collaboration as a driver of digital transformation: Types, benefits and enablers; *HELIYON*, vol. 9, no. 10. Available from: <https://doi.org/10.1016/j.heliyon.2023.e21017>. ISSN 2405-8440.
- FERNÁNDEZ-BATANERO, J. M.; MONTENEGRO-RUEDA, M.; FERNÁNDEZ-CERERO, J. & TADEU, P., 2022. Online education in higher education: emerging solutions in crisis times; *Heliyon*, vol. 8, no. 8. Available from: <https://doi.org/10.1016/j.heliyon.2022.e10139>. ISSN 2405-8440.
- HAKKARAINEN, T.; SALMINEN, L.; ALASTALO, M. & VIRTANEN, H., 2024. Online degree programmes in nurse education – Students' perceptions and academic performance: An integrative review. *Nurse Education Today*, vol. 136. Available from: <https://doi.org/10.1016/j.nedt.2024.106148>. ISSN 0260-6917.
- HAMDAN, K.M.; AL-BASHAIREH, A.M.; ZAHRAN, Z.; AL-DAGHESTANI, A.; AL-HABASHNEH, S. & SHAHEEN, A. M., 2021. University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*, vol. 35, no. 3, pp. 713 – 725. Available from: <https://doi.org/10.1108/IJEM-11-2020-0513>. ISSN 0951-354X.
- HURAJOVA, A.; KOLLAROVA, D. & HURAJ, L., 2022. Trends in education during the pandemic: modern online technologies as a tool for the sustainability of university education in the field of media and communication studies. *Heliyon*, vol. 8, no. 5. Available from: <https://doi.org/10.1016/j.heliyon.2022.e09367>. ISSN 2405-8440.
- IBARRA-VAZQUEZ, G.; RAMÍREZ-MONTOYA, M. S.; BUENESTADO-FERNÁNDEZ, M. & OLAGUE, G., 2023, Predicting open education competency level: A machine learning approach. *Heliyon*, vol. 9, no. 11. Available from: <https://doi.org/10.1016/j.heliyon.2023.e20597>. ISSN 2405-8440.

- LIMA, E. de S.; De OLIVEIRA, U. R.; COSTA, M. de C.; FERNANDES, V. A. & TEODORO, P., 2023. Sustainability in Public Universities through lean evaluation and future improvement for administrative processes. *Journal of Cleaner Production*, vol. 382. Available from: <https://doi.org/10.1016/j.jclepro.2022.135318>. ISSN 0959-6526.
- MAIRAL, R., 2022. What should the university of the future look like? *On the Horizon*, vol. 31, no. 1, pp. 62 – 70. Available from: <https://doi.org/10.1108/OTH-08-2022-0050>. ISSN 1074-8121.
- MALIK, A.; ONYEMA, E. M.; DALAL, S.; LILHORE, U.K.; ANAND, D.; SHARMA, A. & SIMAIYA, S., 2023. Forecasting students' adaptability in online entrepreneurship education using modified ensemble machine learning model. *Array*, vol. 19, no. 100303. Available from: <https://doi.org/10.1016/j.array.2023.100303>. ISSN 2590-0056.
- MOORHOUSE, B.L.; YEO, M.A. & WAN, Y., 2023. Generative AI tools and assessment: Guidelines of the world's top-ranking universities. *Computers and Education Open*, vol. 5, no. 100151. Available from: <https://doi.org/10.1016/j.cao.2023.100151>. ISSN 2666-5573.
- NAZNEEN, A.; ELGAMMAL, I.; KHAN, Z.R.; SHOUKAT, M.H.; SHEHATA, A. E. & SELEM, K. M., 2023. Towards achieving university sustainability! Linking social responsibility with knowledge sharing in Saudi universities. *Journal of Cleaner Production*, vol. 428, no. 139288. Available from: <https://doi.org/10.1016/j.jclepro.2023.139288>. ISSN 0959-6526.
- ROTONDO, F.; GIOVANELLI, L. & EZZA, A., 2023. Implementing sustainable innovation in state universities: Process and tools. *Journal of Cleaner Production*, vol. 391, no. 136163. Available from: <https://doi.org/10.1016/j.jclepro.2023.136163>. ISSN 0959-6526.
- SAKELLARI, E.; OKAN, O.; DADACZYNSKI, K.; KOUTENTAKIS, K. & LAGIOU, A., 2024. Digital health literacy and information-seeking on the internet in relation to COVID-19 among university students in Greece. *Computer Methods and Programs in Biomedicine Update*, vol. 5, no. 100139. Available from: <https://doi.org/10.1016/j.cmpbup.2024.100139>. ISSN 2666-9900.
- SALMAN, D. & SOLIMAN, C., 2022. Insights from online education in the Egyptian higher education. *International Journal of Educational Management*, vol. 37, no. 1, pp. 135 – 146. Available from: <https://doi.org/10.1108/IJEM-05-2022-0173>. ISSN 0951-354X.
- SCHUBERT, T.; KROLL, H. & CHAVEZ, C. G., 2023. The effects of sustainability orientation on research and teaching efficiency in German universities. *Socio-Economic Planning Sciences*, vol. 88, no. 101676. Available from: <https://doi.org/10.1016/j.seps.2023.101676>. ISSN 0038-0121.

- STOYANOVA, T. & BOYANOV, L., 2022. Models for the digitization of the learning process in higher schools / on the example of University of National and World Economy. *International Conference on High Technology for Sustainable Development (HiTech)*. pp. 1 – 4. Available from: doi: 10.1109/HiTech56937.2022.10145550.
- TAN, D. Y. & Cheah, C. W., 2021. Developing a gamified AI-enabled online learning application to improve students' perception of university physics. *Computers and Education: Artificial Intelligence*, vol. 2, no. 100032. Available from: <https://doi.org/10.1016/j.caeai.2021.100032>. ISSN 2666-920X.
- TIWARI, C.K.; BHASKAR, P. & PAL, A., 2023. Prospects of augmented reality and virtual reality for online education: a scientometric view. *International Journal of Educational Management*, vol. 37, no. 5, pp. 1042 – 1066. Available from: <https://doi.org/10.1108/IJEM-10-2022-0407>. ISSN 0951-354X.
- TOLENTINO, S.; SHTELE, E.; MESSORI, G. & PEROTTO, E., 2024. Sustainable mobility policies at Universities: What after the pandemic? *Case Studies on Transport Policy*, vol. 15, no. 101155. Available from: <https://doi.org/10.1016/j.cstp.2024.101155>. ISSN 2213-624X.
- XIN, B. & MA, X., 2023. Gamifying online entrepreneurship education and digital entrepreneurial intentions: An empirical study. *Entertainment Computing*, vol. 46, no. 100552. Available from: <https://doi.org/10.1016/j.entcom.2023.100552>. ISSN 1875-9521.

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