



## Research article

# 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

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## ABSTRACT

The involuntary shutdown at universities during the COVID-19 pandemic and the impossibility of full-time teaching forced university teachers to look for other ways of communication strategies through Internet platforms with students and in everyday academic activities. The aim of this study is to reveal the attitudes and perception of university teachers in the field of Media and Communication Studies in Slovakia during two years of online home learning (2020 and 2021) when the first two waves of the COVID-19 pandemic took place. The aim was to show changes in the perception of the situation in terms of existing positives and negatives during this period as well as to point out a possible trend in the communication strategies used to ensure the sustainability of the education system. Due to the lockdown, the survey was only conducted in electronic format using online questionnaires. The participants were university teachers from the field of Media and Communication Studies. As this is a progressive field the study of which is carried out at the intersection of the interests of several scientific disciplines, it can be assumed that the conclusions can easily be transferred to social, economic, humanities and arts disciplines. When communicating and teaching students in 2020 and also in 2021, online teaching through systems such as Zoom or Google Meet and individual consultations by e-mail, chat and social networks dominated. As the results of the study indicate, modern online technologies contribute to the sustainability of the educational process during an emergency and will become an integral part of university education even after the end of the pandemic situation.

## 1. Introduction

During the Covid-19 pandemic, many educational institutions transitioned to online teaching and learning. Online learning can take place in the classroom with the teacher and students being together in the classroom and working on their tasks digitally and at the same time, interacting in person (Kraľovičová, 2020). Distance learning, alongside online learning, relies on teaching and learning in the online environment; however, contrary to online learning, face-to-face interaction between educators and students is absent or is carried out using various communication tools. As the transition to the online environment was sudden and unexpected, the instructors were unprepared for this crisis situation, not having adequate time and facilities to plan distance education consistently. The practices carried out in distance education during this period were classified as ‘emergency distance education’ (Durak

and Çankaya, 2020). E-learning platforms have played a crucial role in online learning since the outbreak of the pandemic ensuring an easy access to the content of the teaching and teaching materials on one hand and less expenses on the other. Generally, e-learning is a web-based education system that exploits technology for educational purposes (Maatuk et al., 2021).

In-person teaching and learning have been superseded by distance learning options, including synchronous and asynchronous distance learning. In synchronous online learning, students are educated by a teacher simultaneously in a location-independent manner (Brady and Pradhan, 2020) communicating in a particular virtual environment at a set time (Rigo and Mikus, 2021) Educational content is synchronously delivered via videoconferencing and teleconferencing platforms like Zoom, Webex and others, live-chatting or streamed lessons. Asynchronous learning, on the contrary, does not occur in real time and the interaction

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between the teacher or instructor and learners is conducted through applying emails with assignments to complete, recordings, videos or texts to read. Students work individually, they are flexible and communicate with instructors at certain intervals via social media and email.

Plenty of research has been done into university students' and teachers' perception of distance online learning and their own online delivery competence during the Covid-19 pandemic from university teachers' and students', e. g., (Durak, and Çankaya, 2020b), (Bakhov et al., 2021), (Abou-Khalil et al., 2021), (Shih et al., 2021), (Bond, 2020), (Poláková, and Klímová, 2021).

Several studies have been published on synchronous and asynchronous learning during the pandemic indicating that both synchronous and asynchronous online courses have a positive influence on university students' learning experience, (Lin and Gao, 2020), (Basri et al., 2021), (Amelia et al., 2021), (Khan et al., 2021). Furthermore, university teachers' perspectives on delivering synchronous online lessons were investigated suggesting positive effects of remote teaching on university teachers' and students' motivation to study (Moorhouse and Kohnke, 2021). Several studies, however, conclude that teachers' and students' motivation for asynchronous distance education practices seem to be insufficient e. g., (Altun et al., 2021); more specifically, there is still room for improvement in faculties', academic staff and student readiness for online learning, which hinders the implementation of efficient online delivery (Cutri et al., 2020), Moorhouse (2021) (Almazova et al., 2020), or expressed their negative adaptation to both synchronous and asynchronous distance learning (Flores et al., 2021).

Plentiful studies have been carried out observing students' perceptions of online learning during the Covid-19 pandemic in a number of areas like learner satisfaction with online instruction; course delivery including multimedia quality; effectiveness of synchronous and asynchronous learning; academic stress and emotional intelligence coping strategies; or the influence of emotions such as enjoyment or anxiety (Butnaru et al., 2021), (Pal et al., 2020), (Unger and Meiran, 2020), (Khalil et al., 2020), (Chandra, 2020), (Rizun, and Strzelecki, 2020).

Although both synchronous and asynchronous distance learning generally have a positive effect on students' learning, some challenges can still be identified. For example, students' skills and capabilities concerning synchronous and asynchronous learning delivery are not sufficient, with the students not being yet ready to continue in a synchronous method of delivery. Educational institutions are, therefore, recommended to provide a supplementary form of delivery to retain academic excellence (De Guzman, 2020). Also, upskilling of tertiary educators in the implementation and use of digital platforms is recommended (Lorenza, and Carter, 2021). Other studies examine problems that have arisen in connection with the implementation of modern technologies in synchronous/asynchronous delivery, obstacles and limitations in the use of modern technologies such as insufficient access to the Internet and digital technologies, low computer literacy levels or technical constraints (Štefančík and Stradiotová, 2021), (Turnbull et al., 2021), (Muthuprasad et al., 2021). An amount of research has been done into ethics and academic dishonesty experienced by educational institutions after the implementation of synchronous/asynchronous delivery tools, e. g., (Lopez, and Solano, 2021), (Ayoub, and Aladwan, 2021), (Hussein et al., 2020).

Given the emergency situation caused by the pandemic and the unclear future of measures for higher education institutions, it is important to know the reactions of higher education institutions from the perspective of teachers as well as students, to examine the period of emergency measures during the first wave of the pandemic in terms of the quality of education, the ability of universities to respond flexibly, and students' awareness of the measures taken. The research results collected will serve as a look at the suitability of various forms of distance learning and the possibility of modernizing study programs and teaching methods in the future, taking into account a higher use of information technology and digitization of teaching.

Generally, it can be noted that in the scientific literature the main research topics regarding the COVID-19 pandemic impact on teaching and learning in higher education institutions include, e.g., efficiency of online education and telework; attitude of teaching staff and employees towards online education, and attitudes of students towards online education.

The following three studies carried out in university education can be mentioned as examples: Raišienė et al., 2020 examine how Lithuanian public sector employees, including university teachers, evaluate the advantages and disadvantages of home office. They discover that the differences in the evaluation of telework efficiency are based on gender, age, education, work experience and experience of telework. Emanuela Mari et al. (2021) focus their research on comparing the stress and overall well-being of Italian teachers with selected mentally active professions whose workspace was transferred to private homes due to restrictive measures during COVID-19. In their research, Edelhauser and Lupu-Dima (2020) emphasize the readiness of Romanian universities for distance learning and the ability to financially manage the selection of more sophisticated learning platforms in the transition to the online environment.

Rasheed et al. (2020) argue that online teaching can be a real challenge for long term academics and related practices. Teachers' skepticism about the effectiveness of online instruction in improving learning could hinder their adoption of online education. In the transition to online education, teachers may consider many aspects as dysfunctional (platforms, teacher-student communication and interaction) and the participants showed mainly negative attitudes. This may be due to the extreme novelty of some of them, and coping patterns were closely linked to the adaptability expressed (Popa et al., 2020).

Even with a relatively high level of computer literacy and IT support from the university, most teachers still face some difficulties in online learning (Almazova et al., 2020). Teachers face challenges and are being challenged by competency, operational, self-regulation, and isolation issues (Aini et al., 2020). Social distancing, technological anxiety, limited access to online teaching equipment or software, and the complexity of engaging in online teaching systems can lead some teachers to either refuse or be reluctant to deliver online courses, which would inevitably lead to a rapid deterioration in the quality of teaching and learning. This would lead to a serious disturbance in students' achieving their desired educational goals (Huang et al., 2021).

On the other hand, many researchers have noted the positive impact of the e-learning environment on improving the quality of the educational process. It thus increases the effectiveness of knowledge, supports critical thinking and lifelong learning skills, and develops self-learning and information processing skills, making the learning process more active, interesting and fun (Sadeghi, 2019; Eom and Ashill, 2018). In general, teachers have the competence to design strategies and make effective use of online interaction for online teaching (Moorhouse et al., 2021), and to deliver the content of traditional online courses in an innovative way through well-structured courses and increase the proximity between students and teachers asynchronously online (Heilporn et al., 2021).

The transition from the traditional model to distance education is not an easy task and distance education in its modern form develops mainly in a specific educational, technological, social and economic context. The transition is all the more challenging when teachers do not have enough time to adapt and adjust their pedagogical assumptions (Bojović et al., 2020). Hodges et al. (2020, p. 7) emphasize the need to distinguish between emergency distance teaching, which is done in a hurry with minimal resources and insufficient time, and a day-to-day type of effective online teaching. Alhawsawi and Jawhar (2021) describe teachers' experiences with the call to shift teaching from the traditional full-time mode to a fully online mode within three days, and outline the individual and institutional experiences of higher-education teachers at a university in Saudi Arabia.

Oliveira et al. (2021) state that using the context of emergency distance teaching can lead to mixed results in terms of the learning process. On one hand, the use of ICT platforms usually brings a positive experience, but on the other, the need for personal adaptation is mostly a negative experience. In addition, teaching during the pandemic crisis has changed the typical perception of preparation and readiness. The negative connotations of risk-taking and making mistakes in teaching and learning online have been mitigated by a combination of affective factors such as humility, empathy and even optimism that have enabled them to build a friendly relationship with their students.

However, the results also show a significant number of positive experiences with teaching and learning in the university environment during the COVID-19 pandemic. Online teaching brings, among other things, an increase in the level of self-learning, self-directed learning and technological knowledge of students, and an increase in the level of teachers' technological pedagogical knowledge during online teaching and learning (Yan, 2021). There is no question that shifting teaching into the online environment through online technologies is a way to maintain continuity of learning for students. However, from the teachers' point of view, it is necessary to ensure continuous and personalized professional development with a focus on pedagogical and technological support, to examine and accept change as a long-term response (Badiozaman et al., 2020).

Insufficient preparedness, but also insufficient support for teachers at universities delivering courses online, can lead to academics being overwhelmed by their experience of emergency online shift and distrusting long-term and more fundamental acceptance of digital pedagogy by their institutions (Watermeyer et al., 2021). On the other hand, if teachers receive appropriate support and tools for their online classes from schools, this tends to overcome existing challenges in online teaching (Na and Jung, 2021). It can be assumed that the current situation will have a positive effect on digital innovation in higher education as a result of the pandemic crisis, the great commitment of many teachers and increased expectations (Zawacki-Richter, 2021).

In order to better compensate for the disrupted educational process with the occurrence of the Covid-19 pandemic, a better understanding of how the pandemic has affected students' and teachers' attitudes to online education is needed, as well as considering the various aspects of the online learning process (Nikou, 2022).

This study could contribute to an existing body of knowledge that could help universities plan for the future implementation of online education, motivate their teachers and minimize challenges, which could improve the intent and preferences for using online education for future implementation.

## 2. Materials and methods

Slovakia is the country which handled the first wave of the COVID-19 pandemic in spring 2020 as one of the best countries; however, in the second wave of the pandemic in winter 2020/2021, it was one of the most affected countries. Both in the first and in the second wave of the pandemic, teaching and learning at universities in Slovakia were delivered online, i.e. all educational activities at universities (lectures, laboratory exercises, seminars and exams) were not allowed face-to-face. Students and teachers connected from home and all the activities took place online. At the end of the academic year, in the summer term, measures were relaxed and some activities such as testing could also take place face to face in small groups of up to 6 people. The online structured questionnaire was active in June 2020 and a year later in June 2021, always at the end of the term, and it took an average of about 15 min to complete.

The survey was conducted electronically through a structured online questionnaire created using the Google Forms application. It is a tool designed for creating online questionnaires, and collecting and evaluating answers. The questionnaire was distributed to official e-mail contacts of university teachers at individual workplaces in Slovakia. It was

drawn from a publicly available list of higher education institutions and universities providing education in the field of media and communication studies, on the Portal of Universities PortalVS.sk. The portal provides professionally guaranteed information about universities in Slovakia. The basic group consists of university teachers from 8 faculties and 13 departments at the following universities: Catholic University in Ružomberok, Pan-European University in Bratislava, University of Prešov in Prešov, Comenius University in Bratislava, Constantine the Philosopher University in Nitra, Pavol Jozef Šafárik University in Košice, University of Ss. Cyril and Methodius in Trnava and University of Žilina in Žilina. The sample consists of all respondents who participated in the survey at the time of distribution of the questionnaire.

The study was targeted at all university teachers in the field of Media and Communication Studies in Slovakia, including 154 teachers in the principal register of the Ministry of Education and 68 Ph.D. students in this field. An electronic invitation to participate was sent to all respondents. The sample was continuously checked during data collection and the least represented workplaces were contacted again.

A total of 96 questionnaires were completed and returned, with a response rate of 43.2% (n = 96/222) of university teachers/PhD. students in the field of Media and Communication Studies in Slovakia. The final sample consisting of 96 participants from a target population of 222 respondents in the field of Media and Communication Studies guarantees a maximum margin of error of 7.55% for a 95% confidence level. The maximum margin of error of such models shall not exceed 10 %; the collected sample meets the given condition. All the respondents were practising teachers. The resulting sample is representative of the population of university teachers working at universities and higher education institutions in Slovakia in the field of Media and Communication Studies. In addition to the representation of the universities and individual workplaces, the sample in the second wave of the survey was checked based on age, gender and job position.

Completion of the questionnaire was voluntary and anonymous. The respondents were contacted via e-mail with an online link to the questionnaire. All participants were informed of the purpose of the study. The structured questionnaire consisted of 18 factual questions and 3 identification questions (age, gender, job position). In terms of answer variants, the questionnaire contained closed questions, specifically selection (3, 7), dichotomous (5, 6, 12, 13, 14) and verbal assessment scales (1, 2, 4, 8, 9, 10, 11, 15, 16, 17, 18).

A total of 96 university teachers in the field of media and communication studies in the Slovak Republic who were delivering their courses online during the pandemic took part in the survey. The sample contained 45.83 % (N = 44) males and 54.17 % (N = 52) females, Table 1.

Prior to statistical analysis, the answers were assigned numerical values according to the chosen question: no 0, yes 1; agree 1, rather agree

**Table 1.** Socio-demographic characteristics.

Variable		N	%
<b>Gender</b>	Female	52	54.17
	Male	44	45.83
<b>Age</b>	up to 29	17	17.71
	30 to 44	48	50.00
	45 to 59	19	19.79
	60 to 74	12	12.50
	75 and older	0	0.00
<b>Job position</b>	PhD student	16	16.67
	Researcher	3	3.13
	Assistant Professor	49	51.04
	Senior Lecturer	17	17.71
	Associate Professor	8	8.33
	Professor	3	3.13
<b>Total</b>		96	100

2, neutral 3, rather disagree 4, disagree 5; never 1, few times 2, medium 3, most of the time 4, all the time 5.

Spearman's rank-order correlation was used to measure the relationships between the study variables. Different groups of respondents were defined based on gender, age and job position. Data between two groups were compared using the Mann–Whitney U test. Differences between more than two groups were analyzed using the Kruskal–Wallis 1-way ANOVA analysis, and statistical significance in post-hoc analysis was determined using Dunn–Bonferroni post hoc correction. The level of statistical significance was established with a 95 % confidence interval ( $p < 0.05$ ). Statistical tests were conducted using IBM SPSS software version 28.

### 2.1. Ethics approval and consent to participate

The research has been conducted in compliance with the ethical standards required for research with human beings, respecting the basic principles included in the Helsinki Declaration and the code of good practice in research of the University of Ss. Cyril and Methodius in Trnava. The online survey was strictly anonymous and was completely voluntary. Participants were informed before their participation that no identifiable data will be collected and that their participation is completely voluntary. The data is used for research purposes only. The study was approved by the management of the University of Ss. Cyril and Methodius in Trnava.

## 3. Results

### 3.1. Comparison of groups

Comparison of the participants was made from the point of view of division into groups. Three different comparisons were made based on the division according to gender (male, female), age (up to 29, 30 to 44, 45 to 59, 60 to 74) and according to the job position held at university (PhD student, Researcher, Assistant Professor, Senior Lecturer, Associate Professor, Professor).

As can be seen from [Table 2](#), the evaluation of the negatives and positives of teaching and teleworking as well as the barriers that university teachers in the field of media and communication studies encountered during the pandemic differed between males and females for each year.

In terms of the positives in 2020 during the pandemic, females statistically more valued the opportunity of teaching from the comfort of their home ( $r = 0.380$ ,  $p < 0.01$ ) and time savings ( $r = 0.264$ ,  $p < 0.01$ ) similar to 2021 ( $r = 0.230$ ,  $p < 0.05$ ), with strong overall positives. In terms of barriers in the second year of the pandemic, 2021, females encountered more limited opportunities to cooperate with colleagues ( $r = 0.248$ ,  $p < 0.05$ ), difficulties in organizing time while working from home, increased home care as a result of their own work and children learning from home ( $r = 0.240$ ,  $p < 0.05$ ), which constituted serious barriers; on the other hand, insufficient Internet connection ( $r = 0.314$ ,  $p < 0.01$ ) did not constitute a serious barrier.

In terms of negatives in the second year of the pandemic, 2021, females felt more negative about insufficient technical equipment ( $r = 0.222$ ,  $p < 0.05$ ), insufficient Internet connection ( $r = 0.331$ ,  $p < 0.01$ ), privacy intrusion ( $r = 0.288$ ,  $p < 0.01$ ) and insufficient experience with the online environment ( $r = 0.281$ ,  $p < 0.01$ ), but none of them constituted a serious negative. A serious negative that females encountered more in 2020 was the lack of experience with the online environment ( $r = 0.324$ ,  $p < 0.01$ ). Men in the second year of the pandemic were more inclined to believe that the pandemic did not bring any negatives ( $r = -0.225$ ,  $p < 0.05$ ); however, generally, they disagreed with this view. In 2020, females reported statistically more that this was their first experience of online teaching, males reported limited experience of online teaching ( $r = 0.286$ ,  $p < 0.01$ ).

The Mann–Whitney U test, see [Table 2](#), and the Kruskal–Wallis test with post-hoc Dunn–Bonferroni method were used to further examine

how gender, different age groups and different job positions assessed the factors influencing teaching and teleworking, [Table 3](#) and [Table 4](#).

The connection between staff age and other variables was further examined. Older academic staff members stated in 2021 that students taking their course performed better ( $r = 0.215$ ,  $p < 0.05$ ); they felt that the formal way of communication with management had increased ( $r = 0.260$ ,  $p < 0.05$ ); in 2021, they encountered more negatives regarding the long time preparation for online classes ( $r = 0.215$ ,  $p < 0.05$ ), while in 2020, they statistically more considered insufficient participation of students in online lessons to be a minor negative ( $r = 0.279$ ,  $p < 0.01$ ) and the cancellation of conferences and a lack of opportunities to publish research were considered to be obstacles ( $r = 0.330$ ,  $p < 0.01$ ). Younger academic staff members perceived a shorter time devoted to getting ready for work as a positive in 2020 ( $r = -0.339$ ,  $p < 0.01$ ); after the summer semester in 2020 had ended, they found that their readiness for online education in the next semester was better ( $r = 0.250$ ,  $p < 0.05$ ).

Findings from the second year of the pandemic, 2021, indicate that the up to 29 generation had extensive experience with online teaching, testing and conferences, compared to the 45 to 59 and 60 to 74 generations ( $p = 0.008$ ;  $p = 0.01$ ). Also, the 60 to 74 generation had an unreliable Internet connection for online work compared to the up to 29 generation ( $p = 0.039$ ). The difference was seen in the refusal to keep activities online even after the end of the pandemic; unlike generation 45 to 59, generation 30 to 44 saw a statistically bigger problem with keeping testing online ( $p = 0.048$ ) and, unlike the up to 29 generation, generation 30 to 44 saw a statistically bigger problem with online conferences ( $p = 0.013$ ) and state exams held online ( $p = 0.021$ ). In the first year of the pandemic, the test showed that generations 30 to 44 and 45 to 59, compared to the up to 29 generation, used the sharing of study materials to a greater extent for communication in teaching ( $p = 0.039$ ;  $p = 0.024$ ), while the 45 to 59 generation used e-learning systems more ( $p = 0.045$ ). In the first year of the pandemic, the 30 to 44 generation, compared to the 45 to 59 generation, felt more that the students had completed the course with a better grade than in the previous year ( $p = 0.036$ ). The oldest 60 to 74 generation, unlike the youngest up to 29 generation, encountered barriers in terms of cancelled conferences and the loss of opportunities to publish research during the pandemic ( $p = 0.033$ ). The oldest 60 to 74 generation, unlike the 30 to 44 generation ( $p = 0.026$ ) and also the 45 to 59 generation ( $p = 0.011$ ), encountered barriers in terms of limited cooperation with colleagues. Also, the youngest up to 29 generation, compared to 45 to 59 generation ( $p = 0.025$ ), also encountered barriers in terms of limited cooperation with colleagues.

In terms of job positions, academic staff members also had a different appreciation of the course of teaching and teleworking during the two years of the pandemic. In the second year of the pandemic, in 2021, academics in senior academic positions in the field of Media and Communication Studies saw the following aspects as negatives: insufficient personal experience with the online environment ( $r = 0.236$ ,  $p < 0.05$ ), insufficient feedback from students ( $r = 0.261$ ,  $p < 0.05$ ), low participation of students in online teaching ( $r = 0.213$ ,  $p < 0.05$ ) and longer preparation for classes ( $r = 0.240$ ,  $p < 0.05$ ); academics in senior academic positions encountered barriers in terms of limited cooperation with colleagues ( $r = 0.201$ ,  $p < 0.05$ ), insufficient technical equipment ( $r = 0.259$ ,  $p < 0.05$ ) and weak Internet connection ( $r = 0.285$ ,  $p < 0.01$ ); they reported a higher level of formality in communication with management ( $r = 0.295$ ,  $p < 0.01$ ) but also increased informal communication with students ( $r = 0.280$ ,  $p < 0.01$ ); they more strongly disagreed that state exams ( $r = 0.309$ ,  $p < 0.01$ ) and conferences ( $r = 0.275$ ,  $p < 0.01$ ) be held online even after the end of the pandemic; in the first year of the pandemic, in 2020, academics in senior academic positions encountered barriers in terms of cancelled conferences and the loss of opportunities to publish research ( $r = 0.244$ ,  $p < 0.05$ ).

In the second year of the pandemic, in 2021, academics in junior academic positions expressed more satisfaction with how the pandemic was handled in the workplace ( $r = 0.212$ ,  $p < 0.05$ ); after the end of the summer semester in 2021, they reported better readiness for online

**Table 2.** The results of the Mann Whitney U Test depending on the variable of Gender.

Question	Gender	N	Mean	Std. Deviation	Std. Error	Sig.
2021 During the pandemic, I encountered the following negatives: [insufficient technical equipment (e.g., I do not have my own computer/laptop, or I have an outdated one)]	male	44	0.14	0.347	0.052	0.030*
	female	52	0.33	0.474	0.066	
	Total	96	0.24	0.429	0.044	
2021 During the pandemic, I encountered the following negatives: [insufficient Internet connection (e.g., weak signal, unreliable connection)]	male	44	0.18	0.390	0.059	0.001**
	female	52	0.5	0.505	0.070	
	Total	96	0.35	0.481	0.049	
2021 During the pandemic, I encountered the following negatives: [privacy intrusion (e.g., I did not want to show my household or its members)]	male	44	0.2	0.408	0.062	0.005**
	female	52	0.48	0.505	0.070	
	Total	96	0.35	0.481	0.049	
2021 During the pandemic, I encountered the following negatives: [insufficient personal experience with the online environment]	male	44	0.07	0.255	0.038	0.006**
	female	52	0.29	0.457	0.063	
	Total	96	0.19	0.392	0.040	
2021 During the pandemic, I encountered the following negatives: [the situation did not bring any negatives]	male	44	0.3	0.462	0.070	0.028*
	female	52	0.12	0.323	0.045	
	Total	96	0.2	0.401	0.041	
2021 During the pandemic, I encountered the following positives: [time savings (no travelling and moving from one place to another)]	male	44	0.73	0.451	0.068	0.025*
	female	52	0.9	0.298	0.041	
	Total	96	0.82	0.384	0.039	
2021 During the pandemic, I encountered barriers in my research work: [limited possibilities to cooperate with colleagues]	male	44	0.39	0.493	0.074	0.016*
	female	52	0.63	0.486	0.067	
	Total	96	0.52	0.502	0.051	
2021 During the pandemic, I encountered barriers in my research work: [difficulties in organizing time while working from home (increased home care as a result of my own work and children learning from home)]	male	44	0.32	0.471	0.071	0.019*
	female	52	0.56	0.502	0.070	
	Total	96	0.45	0.500	0.051	
2021 During the pandemic, I encountered barriers in my research work: [insufficient Internet connection (e.g., weak signal, unreliable connection)]	male	44	0.14	0.347	0.052	0.002**
	female	52	0.42	0.499	0.069	
	Total	96	0.29	0.457	0.047	
2020 I had some experience before the pandemic and the shift of educational or research activities into the online environment	male	44	2.39	0.618	0.093	0.005**
	female	52	2.71	0.498	0.069	
	Total	96	2.56	0.577	0.059	
2020 During the pandemic, I encountered the following negatives: [insufficient experience with the online environment]	male	44	0.2	0.408	0.062	0.002**
	female	52	0.52	0.505	0.070	
	Total	96	0.38	0.487	0.050	
2020 During the pandemic, I encountered the following positives: [opportunity of teaching from the comfort of my home]	male	44	0.55	0.504	0.076	<.001**
	female	52	0.88	0.323	0.045	
	Total	96	0.73	0.447	0.046	
2020 During the pandemic, I encountered the following positives: [time savings (no travelling and moving from one place to another)]	male	44	0.61	0.493	0.074	0.009*
	female	52	0.85	0.364	0.051	
	Total	96	0.74	0.441	0.045	

\*p < 0.05; \*\*p < 0.01.

education in the next semester ( $r = 0.255$ ,  $p < 0.05$ ), just as in 2020 ( $r = 0.210$ ,  $p < 0.05$ ); they further stated that their students completed their courses in 2021 with equally good grades ( $r = 0.290$ ,  $p < 0.01$ ) similar to the first year of online teaching 2020 ( $r = 0.240$ ,  $p < 0.05$ ); in the first year of the pandemic, in 2020, academics in junior academic positions perceived a shorter time devoted to getting ready for work as a positive ( $r = -0.341$ ,  $p < 0.01$ ).

It is an interesting fact that academic staff members holding the position of Assistant Professor used in their online delivery in 2021 the sending of their own video/audio recordings much more significantly (*almost always*) than all other groups (*never; rarely*) (for all groups  $p < 0.001$ ) and the same applies to sending external video/audio recording, with the exception of the Researcher group ( $p = 0.007$ ;  $p = 0.017$ ;  $p = 0.014$ ;  $p = 0.003$ ). Academic staff members holding the position of Associate Professor encountered in 2021 more insufficient feedback from students than those holding the position of Senior Lecturer ( $p = 0.009$ ).

Staff members holding the positions of Assistant Professor and Senior Lecturer, compared to those holding the position of Professor, reported that the students completed their course with equally good grades to the previous year ( $p = 0.036$ ;  $p = 0.008$ ). Staff members holding the positions of PhD student, Researcher and Associate Professor can, unlike those holding the position of Assistant Professor, imagine in 2021 that their course could continue to be supported by online delivery in the future ( $p = 0.027$ ;  $p = 0.031$ ;  $p = 0.046$ ); and the biggest difference was between staff members holding the positions of PhD student and Assistant Professor in the idea of whether online delivery could replace face-to-face lectures, with those holding the position of Assistant Professor expressed *disagreement* and those holding the position of PhD student stated *rather agree* ( $p = 0.018$ ). Similarly, in 2021, academic staff members holding the position of Professor, unlike those holding the position of PhD student, mentioned insufficient technical equipment as a barrier ( $p = 0.008$ ). Those holding the higher senior position of Professor

**Table 3.** The results of the Kruskal-Wallis test depending on the variable of Age.

Question	Age	N	Mean	F	df	$\chi^2$	Sig.	Sig.	
2021 Before the pandemic and the transfer of pedagogical or scientific activities in the online space I had: extensive experience with online teaching; limited experience with online teaching/testing/conferences; it was my first experience teaching online.	up to 29	17	1.35	6.097	3	8.401	<.001**		
	30 to 44	48	1.79					up to 29–45 to 59	0.008**
	45 to 59	19	2.11					up to 29–60 to 75	0.01*
	60 to 74	12	2.33						
2021 During the pandemic, I encountered barriers in my research work: [insufficient Internet connection (e.g., weak signal, unreliable connection)]	up to 29	17	0.12	2.841	3	1.682	0.042*		
	30 to 44	48	0.31					up to 29–60 to 74	0.039*
	45 to 59	19	0.21						
	60 to 74	12	0.58						
2021 Some of these activities could be continued online even after the end of the pandemic or emergency situation: [testing]	up to 29	17	2.65	4.061	3	28.280	0.009**		
	30 to 44	48	3.75					30 to 44–45 to 59	0.048*
	45 to 59	19	2.63						
	60 to 74	12	2.75						
2021 Some of these activities could be continued online even after the end of the pandemic or emergency situation: [state exams]	up to 29	17	3.00	3.453	3	19.078	0.020*		
	30 to 44	48	4.15					up to 29–30 to 44	0.021*
	45 to 59	19	4.16						
	60 to 74	12	3.58						
2021 Some of these activities could be continued online even after the end of the pandemic or emergency situation: [conferences]	up to 29	17	1.71	3.447	3	18.990	0.020*		
	30 to 44	48	2.92					up to 29–30 to 44	0.013*
	45 to 59	19	2.68						
	60 to 74	12	2.83						
2020 As a form of communication and teaching students I chose: [sending or sharing texts of study materials]	up to 29	17	2.76	3.402	3	17.400	0.021*		
	30 to 44	48	3.79					up to 29–30 to 44	0.039*
	45 to 59	19	4.05					up to 29–45 to 59	0.024*
	60 to 74	12	3.58						
2020 As a form of communication and teaching students I chose: [e-learning system (e.g., Moodle)]	up to 29	17	1.18	3.085	3	20.199	0.031*		
	30 to 44	48	2.17					up to 29–45 to 59	0.045*
	45 to 59	19	2.53						
	60 to 74	12	1.58						
2020 Compared to the previous academic year, I think that students mastered my course: [with a better grade]	up to 29	17	3.35	2.737	3	13.274	0.048*		
	30 to 44	48	2.98					30 to 44–45 to 59	0.036*
	45 to 59	19	3.95						
	60 to 74	12	3.08						
2020 During the pandemic, I encountered barriers in my research work: [cancellation of conferences and the associated lack of opportunities to publish research]	up to 29	17	0.24	3.795	3	2.624	0.013*		
	30 to 44	48	0.40					up to 29–60 to 75	0.033*
	45 to 59	19	0.63						
	60 to 74	12	0.75						
2020 During the pandemic, I encountered barriers in my research work: [limited opportunities to cooperate with colleagues]	up to 29	17	0.82	5.738	3	3.702	0.001**	30 to 44–60 to 74	0.026*
	30 to 44	48	0.48					45 to 59–up to 29	0.025*
	45 to 59	19	0.37					45 to 59–60 to 74	0.011*
	60 to 74	12	0.92						

\*p < 0.05; \*\*p < 0.01.

reported a higher level of formality in communication with management when compared to PhD students, Assistant Professors and Senior Lecturers (p = 0.013; p = 0.025; p = 0.029). Disagreement with the retention of state exams in the online environment even after the end of the pandemic was expressed in 2021 by those holding senior positions like Senior Lecturer, Associate Professor and Professor, unlike PhD students (p = 0.002; p = 0.036; p = 0.043).

In the first year of the pandemic, 2020, academic staff members holding all job positions excluding the position of Researcher, compared to those holding the position of Assistant Professor, expressed statistically their satisfaction with how the workplace handled the pandemic (p = 0.008; p = 0.031; p = 0.016; p = 0.029). PhD students encountered barriers in terms of limited cooperation with colleagues more often than Senior Lecturers (p = 0.021). The deterioration in the quality of publication outputs in the first year of the pandemic, 2020, was felt by those holding the position of Assistant Professor, unlike PhD students and Senior Lecturers (p = 0.038; p = 0.031).

### 3.2. Comparison of both years of the pandemic

For the group of questions for the years 2021 and 2020 the respondents' answers differed statistically significantly and by the calculation from the Mann Whitney U Test, their value was lower than 0.05 or 0.01. Such questions, including the corresponding values, are listed in Table 5.

Academic staff members' satisfaction with how the workplace handled the pandemic was higher in the second year of the pandemic, 2021 (r = -0.227, p < 0.01), shifting from *I rather agree* to *I agree*. Also in 2021, more respondents claimed to have more extensive experience with online teaching (r = -0.227, p < 0.01), there was a shift from the category *It was my first experience* to the category *limited experience with online teaching*.

When speaking about the form of delivery or communication with students, in 2021, compared to 2020, an online lecture, seminar, training, e.g., via Zoom or Google Meet dominated more (r = 0.346, p <

0.01), with a shift from *often* to *almost always*, and individual consultations by e-mail, chat, social networks ( $r = 0.144, p < 0.05$ ), where the use of these ways of communication persisted in the category *often*. On the contrary, in the first year of the pandemic, in 2020, the following methods of delivery and communication with students dominated more, such as sending materials ( $r = -0.247, p < 0.01$ ), there was a shift from *often* to *sometimes*; sharing one's video/audio recordings ( $r = -0.206, p < 0.01$ ), this remaining in the category *rarely*; sending assignments ( $r = -0.188, p < 0.01$ ), this remaining in the category *sometimes*; and online call, telephone ( $r = -0.179, p < 0.05$ ), this remaining in the category *sometimes*.

When comparing the two years of the pandemic in terms of negatives, there was a decrease in the perception of negatives in the first year of the pandemic, 2020, compared to the second year, 2021, namely: insufficient personal experience with the online environment ( $r = -0.209, p < 0.01$ ), insufficient feedback from students ( $r = -0.159, p < 0.05$ ) and longer time preparation for online classes ( $r = -0.275, p < 0.01$ ), with only the negative "insufficient feedback from students" being generally perceived as negative for both years. When referring to positives, there was an increase only in the positive of "modern way of teaching using communication technologies and online platforms" ( $r = 0.157, p < 0.05$ ) which was perceived as positive in both years. In the second year, 2021, there was an increase in the barrier of "limited physical access to library publications" ( $r = 0.181, p < 0.05$ ) which was perceived as a barrier in both years.

While in the first year of the pandemic, 2020, courses were completed with semestral works/projects replacing exams, in the second year of the pandemic, 2021, direct online tools were used more when testing ( $r = -0.301, p < 0.01$ ). In the second year of the pandemic, 2021, there was stronger disagreement with the statement that students during the pandemic mastered the course with better grades ( $r = 0.189, p < 0.01$ ), a shift to the category *rather disagree*.

After the second year of the pandemic, more teachers answered positively to the question of whether the distance method could fully replace face-to-face lectures ( $r = -0.193, p < 0.01$ ), but it still remained in the category not expressing agreement nor disagreement. In the second year of the pandemic, 2021, the level of formality in communication with management ( $r = 0.270, p < 0.01$ ) fell to the category *rather disagree* with formality; on the other hand, formality in communication with students ( $r = 0.238, p < 0.01$ ) went up to the category *rather disagree* with informality.

For the group of questions for 2021 and 2020, a calculation was made using the Mann-Whitney U test, a significant value greater than 0.05 meaning that the null hypothesis is retained: the distribution of the variable is the same across categories of Year. Such questions, including the corresponding values, are listed in [Table 6](#).

As can be seen from [Table 6](#), during both years of the pandemic, 2020 and 2021, teachers from the field of Media and Communication Studies strongly agreed that they had sufficient information on measures at the workplace (Mean = 1.40). For both years, they seldom chose to send or share external video or audio recordings as a form of communication or teaching with students, as well as using an e-learning system (e.g., Moodle) (Mean = 2.27; Mean = 2.33).

With negatives for both years, the respondents encountered an increased likelihood of students cheating during online tests (Mean = 0.58). On the contrary, they did not encounter negatives such as insufficient technical equipment (Mean = 0.25), weak Internet connection (Mean = 0.33), privacy intrusion (Mean = 0.38), low participation of students in online lectures/seminars, practices (Mean = 0.17). They do not agree with the statement that the situation did not bring any negatives (Mean = 0.20). For both years, they perceived self-development (Mean = 0.92), the opportunity to teach from the comfort of their home (Mean = 0.33), time savings (Mean = 0.78), (Mean = 0.33) (Mean = 0.33) as positives. On the contrary, they did not perceive a shorter time devoted to getting ready for work as a positive (Mean = 0.41). They do not agree with the statement that the situation did not bring any positives (Mean = 0.10). Obstacles perceived included: limited possibilities of cooperation with

colleagues (Mean = 0.55), difficulties in organizing time while working from home (Mean = 0.51); on the contrary, the cancellation of conferences and the associated lack of opportunities to publish research (Mean = 0.46), the inability to perform offline questioning (Mean = 0.42), insufficient technical equipment (Mean = 0.25) and weak Internet connection (Mean = 0.32) were not perceived as obstacles.

For both years, the respondents expressed a slight agreement that during the pandemic, compared to the previous academic year, the students mastered the course with equally good grades (Mean = 2.21), but regarding mastering the course with better grades, they did not favour either of the options of agreement or disagreement (Mean = 3.49). For both years, they expressed a slight agreement with their course being delivered through a hybrid approach (Mean = 2.41). On the contrary, they rather disagreed with the opportunity of face-to-face seminars/practices (Mean = 3.90), state exams (Mean = 4.13) and habilitation and inauguration proceedings (Mean = 4.01) to be replaced by online delivery. They did not take a position on the retention of activities in the online environment (Mean = 2.96), retention of testing (Mean = 3.42), and online conferences (Mean = 2.72) in the online environment even after the end of the pandemic.

Disagreement was expressed as concerns publication outputs, specifically, whether the number of publication outputs increased (Mean = 0.29), decreased (Mean = 0.32), the quality of publication outputs increased (Mean = 0.36), the quality of publication outputs decreased (Mean = 0.08). The respondents slightly agreed with the fact that an increased burden was imposed on them during the pandemic, specifically increased requirements for checking and replying to e-mails (Mean = 1.44), more frequent online meetings (Mean = 1.75) and increased administrative burdens for teachers (Mean = 1.64).

### 3.3. Graphical results

After the semester had ended, academic staff members were asked whether they encountered any negatives during the pandemic. As can be seen in [Figure 1](#), in the second year of the pandemic, 2021, the number of perceived negatives encountered by academic staff members decreased in all categories except for *Insufficient Internet connection*, and the category *No negatives* showed the same percentage. On average, the biggest negative perceived was *Increased likelihood of students cheating*. The largest drop in negatives can be seen in *Longer preparation for classes*, with this negative decreasing by up to 27.09 %. It can be stated that after one year of the pandemic, academic staff members were able to better cope with the negatives that arose during distance delivery.

After the semester had ended, academic staff members were also asked whether they encountered any barriers in their research work. The largest increase in barriers in 2021 was observed in the category *Limited physical access to library publications*, where the increase was 17.71 %, which was also the largest barrier in both years, averaging 59.90 %. The smallest barrier encountered in research work was the category *Insufficient technical equipment*, averaging 31.77 %, [Figure 2](#).

After the semester had ended, academic staff members were also asked whether they encountered any positives during the pandemic. As can be seen in [Figure 3](#), in the second year of the pandemic, 2021, the number of perceived positives encountered by academic staff members increased in all categories except for the *opportunity to teach from home*. Even the category *No positives* decreased by 7.29 %. The largest increase in positives can be seen in the category *Modern way of teaching*, with the positive increasing by up to 10.42 %. The biggest positive which reached up to 94.79 % in 2021 was the category of *Self-development* and with only four positives did the limit far exceed 50 %. It can be stated that despite the unfavourable pandemic situation, many academic staff members also encountered positive aspects in distance delivery.

After the end of the summer semester at universities in 2020 and 2021, when classes were delivered only by distance method, the university teachers were asked whether they were better prepared for possible distance delivery in the next semester. For both years, as well as

**Table 4.** The results of the Kruskal-Wallis test depending on the variable of Position.

Question	Position	N	Mean	F	df	$\chi^2$	Sig.	Sig.	
2021 As a form of teaching and communication with students I chose: [sending or sharing my own video or audio recordings]	PhD. student	16	1.44	8.224	5	39.248	<0.001**	A.prof.-PhD.st.	<0.001**
	Researcher	3	1.33					A.prof.-Res.	<0.001**
	Assistant professor	3	5.00					A.prof.-Sen.L.	<0.001**
	Senior Lecturer	49	1.49					A.prof.-Assoc. prof.	<0.001**
	Associate professor	17	1.76					A.prof.-Prof.	<0.001**
	Professor	8	1.00						
2021 As a form of teaching and communication with students I chose: [sending or sharing external video or audio recordings]	PhD. student	16	2.00	3.361	5	29.100	0.008**	A.prof.-PhD.st.	0.007**
	Researcher	3	2.00						
	Assistant professor	3	5.00					A.prof.-Sen.L.	0.017*
								A.prof.-Assoc. prof.	0.014*
	Senior Lecturer	49	2.37					A.prof.-Prof.	0.003**
	Associate professor	17	2.18						
2021 During the pandemic, I encountered the following negatives: [insufficient feedback from students]	PhD. student	16	0.44	3.504	5	3.909	0.006**		
	Researcher	3	0.67					S.Lec.-Assoc.prof	0.009**
	Assistant professor	3	0.00						
	Senior Lecturer	49	0.41						
	Associate professor	17	0.88						
	Professor	8	0.63						
2021 I think that during the pandemic, compared to the previous academic year, students mastered my course: [with equally good grades]	PhD. student	16	2.13	3.344	5	25.721	0.008**		
	Researcher	3	1.33					Prof.-A.prof.	0.036*
	Assistant professor	3	1.00					Prof.-S.Lec.	0.008**
	Senior Lecturer	49	1.92						
	Associate professor	17	2.18						
	Professor	8	3.63						
2021 I can imagine that my course could continue through hybrid delivery (a combination of distance and face-to-face delivery) maintaining at least the same quality and complexity:	PhD. student	16	1.88	2.855	5	34.051	0.019*		
	Researcher	3	1.00					A.prof.-PhD.st.	0.027*
	Assistant professor	3	5.00					A.prof.-Res.	0.031*
	Senior Lecturer	49	2.55					A.prof.-Assoc. prof.	0.046*
	Associate professor	17	2.06						
	Professor	8	2.63						
2021 Distance delivery fully replaced face-to-face lectures:	PhD. student	16	1.81	3.050	5	34.809	0.014*		
	Researcher	3	1.67					A.prof.-PhD.st.	0.018**
	Assistant professor	3	5.00						
	Senior Lecturer	49	2.76						
	Associate professor	17	3.12						
	Professor	8	2.75						

(continued on next page)



Table 4 (continued)

Question	Position	N	Mean	F	df	$\chi^2$	Sig.	Sig.
2021 I encountered the following barriers in my research work: [insufficient technical equipment (e.g., I do not have my own computer/laptop or I have an outdated one)]	PhD. student	16	0.00	2.960	5	2.395	0.016*	Prof.-PhD.st. 0.008**
	Researcher	3	0.00					
	Assistant professor	3	0.33					
	Senior Lecturer	49	0.27					
	Associate professor	17	0.18					
	Professor	8	0.63					
	2021 Communication with colleagues, management and students during the pandemic brought: [a higher level of formality in communication with management]	PhD. student	16					
Researcher		3	3.00					
Assistant professor		3	5.00					
Senior Lecturer		49	3.61					
Associate professor		17	3.53					
Professor		8	1.88					
2021 Some of these activities could be continued online even after the end of the pandemic or emergency situation: [state exams]		PhD. student	16	2.63	3.668	5	31.907	0.005**
	Researcher	3	3.67					
	Assistant professor	3	3.67					
	Senior Lecturer	49	4.16					
	Associate professor	17	4.06					
	Professor	8	4.38					
	2020 I am satisfied with how the pandemic was handled in my workplace (distance delivery, state exam and other)	PhD. student	16	1.44				
Researcher		3	1.67					
Assistant professor		3	3.00					
Senior Lecturer		49	1.69					
Associate professor		17	1.53					
Professor		8	1.50					
2020 During the pandemic, I encountered barriers in my research work: [limited opportunities to cooperate with colleagues]		PhD. student	16	0.81	5.484	5	5.486	<0.001**
	Researcher	3	0.00					
	Assistant professor	3	1.00					
	Senior Lecturer	49	0.39					
	Associate professor	17	0.76					
	Professor	8	0.88					
	2020 My publication outputs changed during the pandemic: [the quality of publication outputs deteriorated]	PhD. student	16	0.06				
Researcher		3	0.00					
Assistant professor		3	0.67					
Senior Lecturer		49	0.08					
Associate professor		17	0.18					
Professor		8	0.13					

\*p < 0.05; \*\*p < 0.01.

94.79 % of academic staff members said that they *agreed* or *rather agreed* that after having taught by distance method in one semester, they were better prepared for possible distance delivery in the next semester. As can

be seen from Figure 4, in 2021, up to 20.84 % of respondents expressed stronger agreement, which reflects the experience gained with distance delivery during the first year of the pandemic.

**Table 5.** Questions for which different answers occurred during the second year of the pandemic; Mean is the value for the first year of the pandemic, 2020, and for the second year of the pandemic, 2021.

Question	Correlation	Mean 2020/2021	Sig. M-W Test
Satisfaction with handling the pandemic in the workplace (distance delivery, state exams and others)	r = -0.227, p = 0.002**	1.65 1.36	0.002**
Experience with online delivery	r = -0.478, p < 0.001**	2.56 1.84	<0.001**
Form of delivery and communication with students: [sending or sharing texts of study materials]	r = -0.247, p < 0.001**	3.64 2.89	<0.001**
Form of delivery and communication with students: [sending or sharing my own video or audio recordings]	r = -0.206, p = 0.004**	2.19 1.59	0.004**
Form of delivery and communication with students: [sending or sharing assignments, exercises, tasks]	r = -0.188, p = 0.009**	3.49 2.95	0.010*
Form of delivery and communication with students: [individual consultations via e-mail, chat, social networks]	r = 0.144, p = 0.046*	4.19 4.34	0.046*
Form of delivery and communication with students: [online call, telephone]	r = -0.179, p = 0.013*	3.36 2.72	0.013*
Form of delivery and communication with students: [online lecture, seminar, training, e.g., via Zoom or Google Meet]	r = 0.346, p < 0.001**	4.1 4.81	<0.001**
Negatives encountered during pandemic: [insufficient personal experience with the online environment]	r = -0.209, p = 0.004**	0.38 0.19	0.028*
Negatives encountered during pandemic: [insufficient feedback from students]	r = -0.159, p = 0.028*	0.67 0.51	<0.001**
Negatives encountered during pandemic: [longer preparation for online classes]	r = -0.275, p < 0.001**	0.72 0.45	0.030*
Positives encountered during pandemic: [modern way of teaching using communication technologies and online platforms]	r = 0.157, p = 0.029*	0.82 0.93	<0.001**
Course completion: face-to-face exam 1/oral exam via video call 2/supervised written exam via video call 3/online test 4/seminar work or project replacing exam 5	r = -0.301, p < 0.001**	4.02 3.33 — — —	0.009**
Students' course completion compared to previous year: [with a better grade]	r = 0.189, p = 0.008**	3.25 3.73	0.008**
Distance method fully replaced face-to-face lectures	r = -0.193, p = 0.007**	3.24 2.7	0.013*
Barriers to research work encountered during pandemic: [limited physical access to library publications]	r = 0.181, p = 0.012*	0.51 0.69	<0.001**
Communication with colleagues, management and students during pandemic: [higher level of formality in communication with management]	r = 0.270, p < 0.001**	2.83 3.54	0.001**
Communication with colleagues, management and students during pandemic: [higher level of informality in communication with management]	r = 0.238, p < 0.001**	3.06 3.68	0.004**

\*p < 0.05; \*\*p < 0.01.

Course completion in the field of Media and Communication Studies was not identical during the pandemic, Figure 5. In the first year of the pandemic, *semestral works/projects replacing exams* had a dominant position, followed by *online tests*. In 2021, *online tests* and *oral exams via video call* had a dominant position. Form of course completion using a seminar work or project decreased by as much as 22.92 %, *oral exams via video call* increased by 19.79 % and *supervised written exam via video call* increased by 6.25 %, which points to the fact that forms of testing using online tools and video calls came to the fore in the second year of the pandemic.

The form of communication strategy also changed during the second year of the pandemic, 2021, compared to the first year, Figure 6. As for the form of teaching and communication with students, in 2021, compared to 2020, *online teaching through systems such as Zoom or Google*

*Meet* dominated more, where the increase in the category *all the time* was up to 29.17 %; and *individual consultations by e-mail, chat and social networks*, where the increase in the category *all the time* was up to 17.71 %. Both these forms were the most used also in 2020 in the sum of the categories *most of the time* and *all the time*, but in the second year, 2021, an increase in their use can be seen; while other forms recorded a decline, except for the form *e-learning system* which recorded a slight decrease and the form *sharing external video recordings* which experienced stagnation. It can be stated that due to the lack of possibilities to teach face-to-face, there was a trend to replace it by synchronous *online teaching through systems such as Zoom or Google Meet* with additional explanation through individual consultations, and other forms became only complementary.

**Table 6.** Questions with the same distribution in both years (Mann–Whitney U test,  $p > 0.05$ ).

Question	Year	N	Mean	Std. Deviation	Std. Error	Sig. M-W Test
I had enough information in my workplace about university measures taken during the pandemic (e.g., process of teaching, state exams):	2020	96	1.47	0.725	0.074	0.097
	2021	96	1.33	0.675	0.069	
	Total	192	1.4	0.702	0.051	
As a form of teaching or communication with students I chose: [sending or sharing external video or audio recordings]	2020	96	2.39	1,348	0.138	0.478
	2021	96	2.27	1,395	0.142	
	Total	192	2.33	1,370	0.099	
As a form of communication and teaching students I chose: [e-learning system (e.g., Moodle)]	2020	96	1.99	1,525	0.156	0.425
	2021	96	2.11	1,602	0.163	
	Total	192	2.05	1,561	0.113	
During the pandemic, I encountered the following negatives: [insufficient technical equipment (e.g., I do not have my own computer/laptop or I have an outdated one)]	2020	96	0.26	0.441	0.045	0.740
	2021	96	0.24	0.429	0.044	
	Total	192	0.25	0.434	0.031	
During the pandemic, I encountered the following negatives: [insufficient Internet connection (e.g., weak signal, unreliable connection)]	2020	96	0.3	0.462	0.047	0.443
	2021	96	0.35	0.481	0.049	
	Total	192	0.33	0.471	0.034	
During the pandemic, I encountered the following negatives: [privacy intrusion (e.g., I did not want to show my household or its members)]	2020	96	0.4	0.492	0.05	0.552
	2021	96	0.35	0.481	0.049	
	Total	192	0.38	0.485	0.035	
During the pandemic, I encountered the following negatives: [low participation of students in online lectures/seminars, practices]	2020	96	0.22	0.416	0.042	0.086
	2021	96	0.13	0.332	0.034	
	Total	192	0.17	0.378	0.027	
During the pandemic, I encountered the following negatives: [increased likelihood of students cheating during online tests]	2020	96	0.63	0.487	0.05	0.556
	2021	96	0.58	0.496	0.051	
	Total	192	0.6	0.49	0.035	
During the pandemic, I encountered the following negatives: [the situation did not bring any negatives]	2020	96	0.2	0.401	0.041	1.000
	2021	96	0.2	0.401	0.041	
	Total	192	0.2	0.399	0.029	
During the pandemic, I encountered the following positives: [working my way through new things/self-development (I learnt how to work differently compared to previously existing methods)]	2020	96	0.9	0.307	0.031	0.180
	2021	96	0.95	0.223	0.023	
	Total	192	0.92	0.269	0.019	
During the pandemic, I encountered the following positives: [possibility of teaching from the comfort of my home]	2020	96	0.73	0.447	0.046	0.275
	2021	96	0.66	0.477	0.049	
	Total	192	0.69	0.463	0.033	
During the pandemic, I encountered the following positives: [time savings (no travelling and moving from one place to another)]	2020	96	0.74	0.441	0.045	0.164
	2021	96	0.82	0.384	0.039	
	Total	192	0.78	0.414	0.03	
During the pandemic, I encountered the following positives: [a shorter time devoted to getting ready for work]	2020	96	0.4	0.492	0.05	0.769
	2021	96	0.42	0.496	0.051	
	Total	192	0.41	0.492	0.036	
During the pandemic, I encountered the following positives: [the situation did not bring any positives]	2020	96	0.14	0.344	0.035	0.092
	2021	96	0.06	0.243	0.025	
	Total	192	0.1	0.299	0.022	
I think that during the pandemic, compared to the previous academic year, students mastered my course: [with equally good grades]	2020	96	2.33	1,228	0.125	0.067
	2021	96	2.09	1,315	0.134	
	Total	192	2.21	1,274	0.092	
I think that during the pandemic, compared to the previous academic year, students mastered my course: [with better grades]	2020	96	3.25	1,306	0.133	0.577
	2021	96	3.73	1,294	0.132	
	Total	192	3.49	1,318	0.095	
I think that during the pandemic, compared to the previous academic year, students mastered my course: [with worse grades]	2020	96	3.74	1,190	0.121	0.386
	2021	96	3.78	1,316	0.134	
	Total	192	3.76	1,251	0.09	
I can imagine that my course could continue in the combined method of teaching (combination of distance and face-to-face teaching method) and maintain at least the same quality and complexity:	2020	96	2.44	1,413	0.144	0.779
	2021	96	2.39	1,618	0.165	
	Total	192	2.41	1,515	0.109	
Distance method fully replaced face-to-face seminars, practices:	2020	96	3.88	1,242	0.127	0.855
	2021	96	3.93	1,259	0.128	
	Total	192	3.9	1,247	0.09	
During the pandemic, I encountered barriers to my research work: [cancellation of conferences and the associated lack of opportunities to publish research]	2020	96	0.46	0.501	0.051	1.000
	2021	96	0.46	0.501	0.051	
	Total	192	0.46	0.5	0.036	

Table 6 (continued)

Question	Year	N	Mean	Std. Deviation	Std. Error	Sig. M-W Test
During the pandemic, I encountered barriers to my research work: [inability to perform offline questioning]	2020	96	0.42	0.496	0.051	0.884
	2021	96	0.43	0.497	0.051	
	Total	192	0.42	0.495	0.036	
During the pandemic, I encountered barriers to my research work: [limited possibilities to cooperate with colleagues]	2020	96	0.57	0.497	0.051	0.470
	2021	96	0.52	0.502	0.051	
	Total	192	0.55	0.499	0.036	
During the pandemic, I encountered barriers to my research work: [difficulties in organizing time while working from home (increased home care as a result of my own work and learning children from home)]	2020	96	0.57	0.497	0.051	0.084
	2021	96	0.45	0.5	0.051	
	Total	192	0.51	0.501	0.036	
During the pandemic, I encountered barriers to my research work: [insufficient technical equipment (e.g., I do not have my own computer/laptop or I have an outdated one)]	2020	96	0.27	0.447	0.046	0.506
	2021	96	0.23	0.423	0.043	
	Total	192	0.25	0.434	0.031	
During the pandemic, I encountered barriers to my research work: [insufficient Internet connection (e.g., weak signal, unreliable connection)]	2020	96	0.34	0.477	0.049	0.440
	2021	96	0.29	0.457	0.047	
	Total	192	0.32	0.467	0.034	
My publication outputs changed during the pandemic: [number of publication outputs increased]	2020	96	0.35	0.481	0.049	0.057
	2021	96	0.23	0.423	0.043	
	Total	192	0.29	0.456	0.033	
My publication outputs changed during the pandemic: [number of publication outputs decreased]	2020	96	0.29	0.457	0.047	0.440
	2021	96	0.34	0.477	0.049	
	Total	192	0.32	0.467	0.034	
My publication outputs changed during the pandemic: [the quality of publication outputs improved]	2020	96	0.42	0.496	0.051	0.099
	2021	96	0.3	0.462	0.047	
	Total	192	0.36	0.481	0.035	
My publication outputs changed during the pandemic: [the quality of publication outputs deteriorated]	2020	96	0.11	0.32	0.033	0.118
	2021	96	0.05	0.223	0.023	
	Total	192	0.08	0.277	0.02	
My publication outputs changed during the pandemic: [I did not have time to write publication outputs]	2020	96	0.33	0.474	0.048	0.052
	2021	96	0.21	0.408	0.042	
	Total	192	0.27	0.446	0.032	
Communication with colleagues, management and students during the pandemic brought: [increased requirements for checking and replying to e-mails]	2020	96	1.41	0.762	0.078	0.657
	2021	96	1.48	1.281	0.131	
	Total	192	1.44	1.052	0.076	
Communication with colleagues, management and students during the pandemic brought: [more frequent online meetings]	2020	96	1.78	1.144	0.117	0.112
	2021	96	1.72	1.684	0.172	
	Total	192	1.75	1.436	0.104	
Communication with colleagues, management and students during the pandemic brought: [increased administrative burden for teachers (e.g., the need to obtain e-mail contacts)]	2020	96	1.65	1.015	0.104	0.448
	2021	96	1.63	1.107	0.113	
	Total	192	1.64	1.060	0.076	
Some of these activities could be continued online even after the end of the pandemic or emergency situation: [teaching]	2020	96	3.09	1.487	0.152	0.264
	2021	96	2.82	1.542	0.157	
	Total	192	2.96	1.517	0.109	
Some of these activities could be continued online even after the end of the pandemic or emergency situation: [testing]	2020	96	3.64	1.339	0.137	0.099
	2021	96	3.21	1.595	0.163	
	Total	192	3.42	1.484	0.107	
Some of these activities could be continued online even after the end of the pandemic or emergency situation: [state exams]	2020	96	4.38	0.861	0.088	0.070
	2021	96	3.88	1.409	0.144	
	Total	192	4.13	1.191	0.086	

4. Discussion

The COVID-19 disease and the situation it brought about in the field of education and teaching as well as the need to continue teaching students during the pandemic forced teachers to use various online tools and sources in a context they had not been prepared for. They had to adapt their working methods to this new context and learn how to work with distance learning tools as well as to use new communication strategies in line with educational needs. This fact also applies to university teachers from the field of Media and Communication Studies,

who educate graduates being able to continuously or in regular periods produce highly current public content with an emphasis on what is interesting or of importance for the audience, i.e. graduates, who, by exercising their profession in the field of mass media, marketing or multimedia communication, are involved in influencing individuals and society in the commercial and non-commercial spheres, and who are progressive in the use of online technologies (Radoš insk á et al., 2020).

Findings made during the two academic years point to the advantages and disadvantages of distance teaching and learning as well as to the

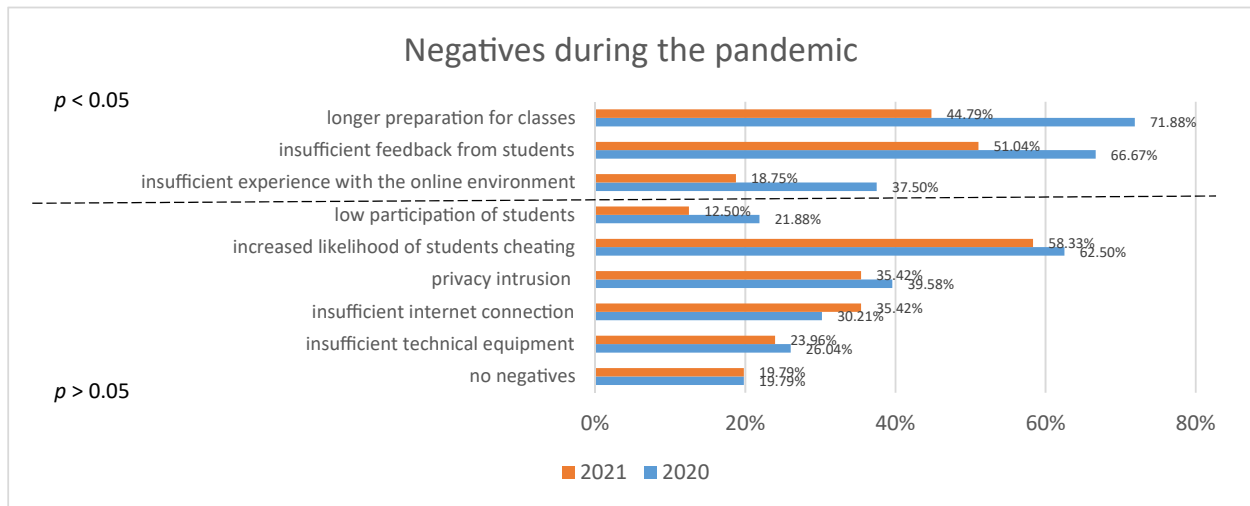


Figure 1. Opinion of university teachers on negatives during the pandemic and presentation of their changes in opinion during the two years of the COVID-19 pandemic.

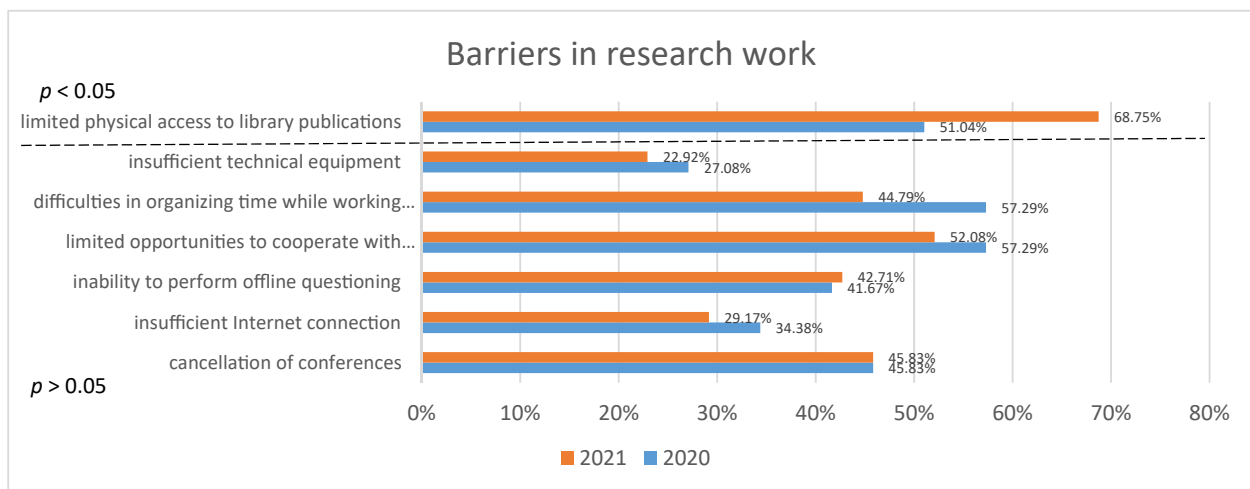


Figure 2. Opinion of university teachers on barriers during the pandemic and presentation of their changes in opinion during the two years of the COVID-19 pandemic.

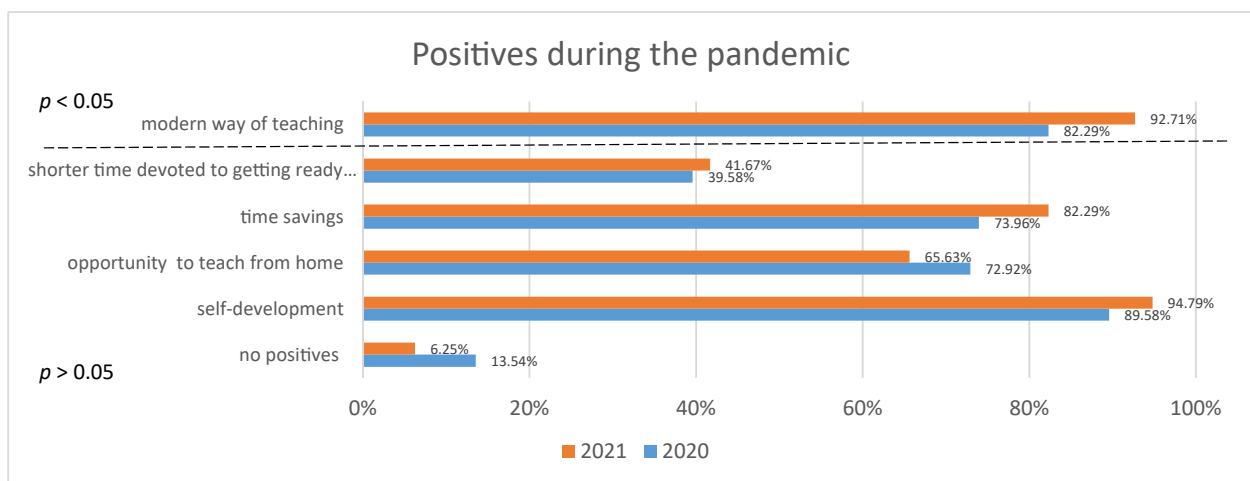


Figure 3. Opinion of university teachers on barriers during the pandemic and presentation of their changes in opinion during the two years of the COVID-19 pandemic.

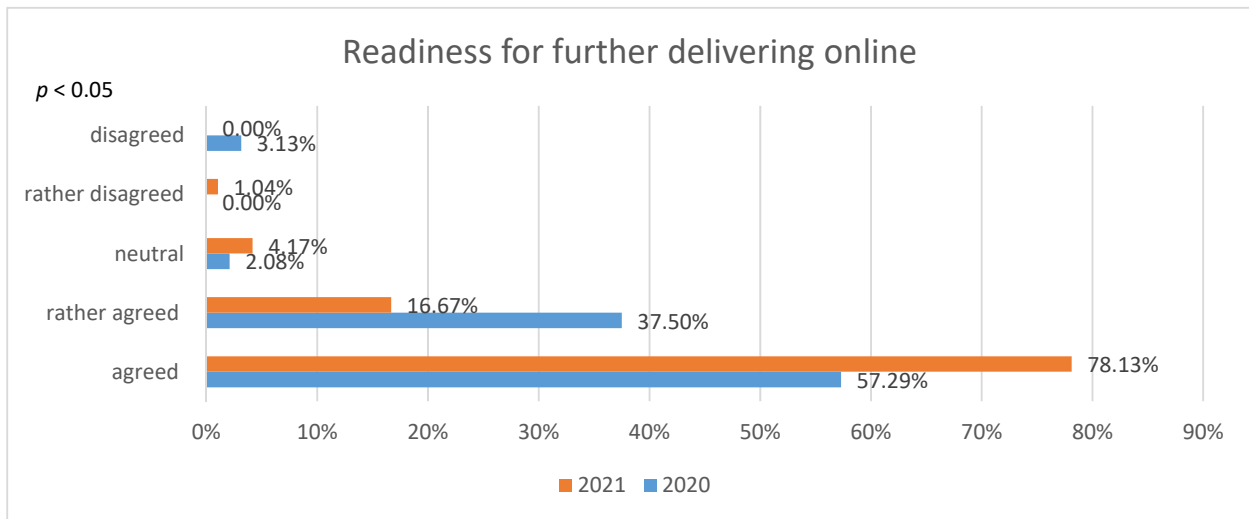


Figure 4. Opinion of university teachers on readiness for further delivering online during the pandemic and presentation of their changes in opinion during the two years of the COVID-19 pandemic.

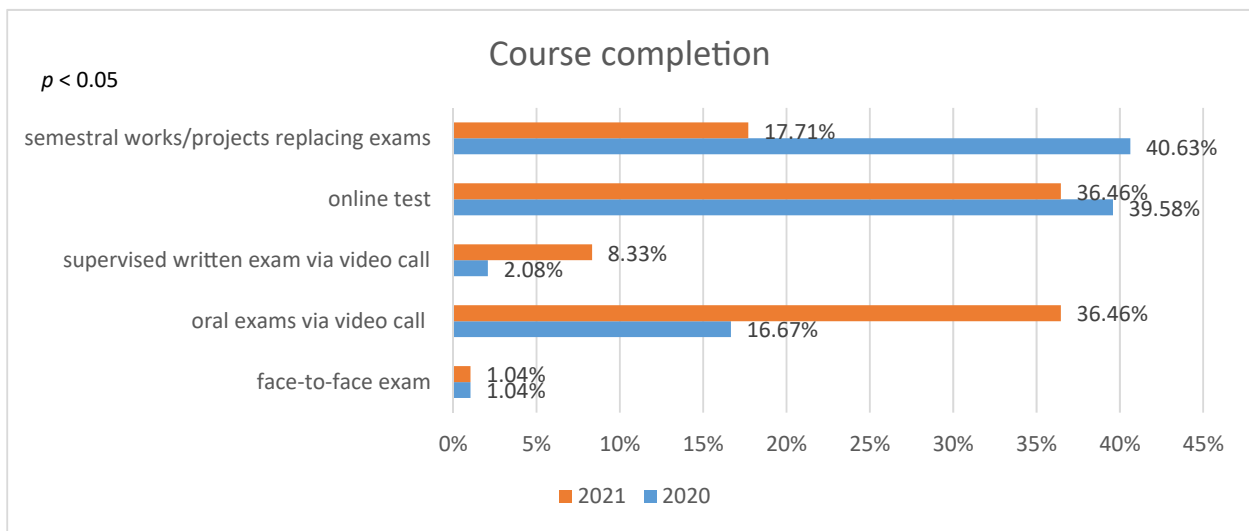


Figure 5. Form of course completion during the pandemic and presentation of their change during the two years of the COVID-19 pandemic.

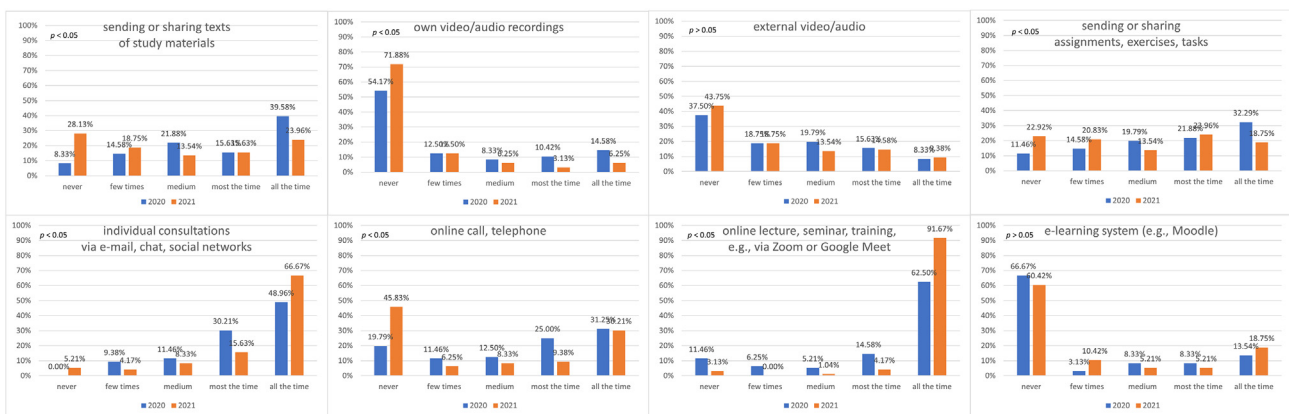


Figure 6. Use of different forms of communication during the pandemic and presentation of their change during the two years of the COVID-19 pandemic in the field of Media and Communication Studies.

changes and the sustainability of some aspects of activities and communication strategies during the pandemic.

Predictably, in the second year of the pandemic, the academic staff members already had more experience with online teaching. Also, in the second year of the pandemic, 2021, as part of the communication strategy, online teaching further dominated, using tools like Google Meet and Zoom, and e-mails and chat were used for individual consultations. Off-line strategies like sending texts of study materials or sending audio/video recordings were more frequently abandoned by teachers. The same effect was seen in the strategy of final testing of students where direct online tools for testing the students were used more frequently in the second year of the pandemic. On the other hand, distance delivery meant an increase in the level of formality in communication with students.

The main negatives as perceived by teachers during both years of the pandemic included: insufficient feedback from students and increased likelihood of students cheating during online tests, with a decline being recorded in the second year in the negative of insufficient feedback from students. Limited opportunities to cooperate with colleagues, difficulties in organizing time while working from home and limited physical access to library publications were perceived as barriers during both years, with the latter recording an increase in the second year. The main positives as perceived by the teachers included: self-development, the possibility of teaching from the comfort of their home, time savings, and modern way of teaching using communication technologies and online platforms, with the latter recording an increase in the second year.

From the point of view of communication strategies in the future, the possibilities of using modern online technologies and communication strategies in education even after the pandemic were also investigated. Although in the second year of the pandemic, 2021, there was a slight increase in agreement on whether distance delivery could fully replace face-to-face lectures, for both years, respondents' attitude to this question was neutral. The respondents disagreed with the possibility of replacing face-to-face seminars with online delivery, and they also disagreed with online state exams. However, for both years, they expressed slight agreement with hybrid delivery of their courses.

When comparing the results from a gender perspective, women were much more hindered by limited opportunities to cooperate with colleagues, difficulties in organizing time while working from home (increased home care as a result of their own work and children learning from home), and privacy intrusion. Women valued time savings and the opportunity to teach from the comfort of their homes more than men.

When analysing the relationship between respondents' age and the study variables, the results showed that older academic staff members felt that the level of formality in communication with management had increased and that they encountered more negatives such as longer preparation for online classes, and the cancellation of conferences and a lack of opportunities to publish research. Limited opportunities to cooperate with colleagues were perceived as a barrier by the youngest and eldest academic staff members. Although differences can be seen between the groups, the attitudes of the younger and older academic staff members often overlapped, the line between the generations was not sharp, and sometimes the attitudes skipped one generation.

When comparing the results concerning the course of teaching and teleworking during the two years of the pandemic, it is still possible to identify differences across job positions. Senior academic positions perceived a lack of personal experience with the online environment and longer preparation for classes as a negative; they reported a higher level of formality in communication with management, but also increased informal communication with students; they more strongly disagree with state exams and online conferences being held online even after the end of the pandemic. The cancellation of conferences and a lack of opportunities to publish research were considered to be obstacles. Junior academic positions were more satisfied with how the workplace handled the pandemic; they felt more confident and reported better readiness for online education; in the first year of the pandemic, a shorter time devoted to getting ready for work was perceived as a positive.

Although the survey focused only on a specific group of university teachers in the field of Media and Communication Studies during the two waves of the pandemic, the qualitative data obtained can be used to illustrate how the COVID-19 pandemic changed the higher education system and to illustrate the sustainability of the educational process during the emergency, and can be generalised to social sciences and humanities. It is the proper use of ICT tools that is an important factor in the sustainable capacity of the educational process and this study illustrates the gradual changes in university teachers' communication strategies over the two years of having to use only distance delivery.

## 5. Conclusions

The case study illustrates the way, scope, and shift in communication strategies in distance delivery used during the two years of the COVID-19 pandemic in university education in the field of Media and Communication Studies in Slovakia. A key element for the sustainability of fully fledged higher education during the impossibility of face-to-face delivery is not only the mastering of ICT tools by teachers but also the appropriate use of modern online technologies and communication strategies for educational purposes and carrying out fundamental academic tasks.

This study looks at university teachers from the field of Media and Communication Studies in order to facilitate the management of education in crisis situations. The sample consists of respondents from eight universities in Slovakia. Initial results for each year have shown that the point of view of university teachers from the field of Media and Communication Studies varies according to their gender, age, and work experience.

The study captures the shift in the second year of the pandemic in distance education and communication strategies, and changes in teachers' attitudes to the situation. The impossibility to teach face-to-face due to the COVID-19 pandemic and the need for online teaching played a major role in changing these attitudes and helped to implement ICT tools directly into the teaching process, which made the educational process more sustainable.

This study showed how different categories of teachers play a role in the taking-up of online technologies in education. The study suggests that many university teachers in the field of Media and Communication Studies have reconsidered and changed their educational practices during the Covid-19 pandemic.

Although several research studies have been carried out on university students' and teachers' perception of the distance online learning during the Covid-19 pandemic, to the best of our knowledge, no research has been done so far investigating the perception of a specific group university teachers in the field of media and communication studies of distance online learning and their own online delivery competence in the time of the pandemic. Therefore, this study can be a valuable contribution to online education research by filling this gap in the literature.

In addition, this study will (i) assist university teachers in the field of Media and Communication Studies thinking of a transition to distance learning, it will provide proposals to those who have already shifted to the online environment, or inspire those trying to foster the effectiveness of internships in compulsory cases, (ii) serve as a guide for Media and Communication Studies teaching programs, and (iii) help the adoption of preventive measures against potential problems. The teachers encountered various problems during the pandemic, and therefore the teachers' views on education, the problems they faced and their proposed solutions should be assessed in the future, and courses should be designed appropriately.

Despite the reduced sample size, the results presented can provide strategic information for university staff and contribute to the design and implementation of sustainable education.

It is also evident from the study that education in the field of Media and Communication Studies, but also in other social and economic sciences, in humanities and artistic sciences will probably never look the same as before the COVID-19 pandemic. Due to the circumstances in

university education imposed by the pandemic, the previous form of traditional teaching will certainly be supplemented by online tools even after the end of the pandemic, and hybrid delivery will probably be used with some parts being replaced by online delivery and online testing. This situation will require a change in curricula but will also require the need for further education of university teachers.

The aim of further research will be monitoring these changes in the upcoming period still affected by the COVID-19 pandemic, analysing positive as well as negative impacts affecting the established trend, as well as trends associated with online education, such as threats to security and privacy of such education.

## Declarations

### Author contribution statement

Anna Hurajova: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Daniela Kollarova: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

Ladislav Huraj: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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### Data availability statement

No data was used for the research described in the article.

### Declaration of interests statement

The authors declare no conflict of interest.

### Additional information

Supplementary content related to this article has been published online at <https://doi.org/10.1016/j.heliyon.2022.e09367>.

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