

THE IMPACT OF ONLINE TEACHING ON FACULTY TEACHERS DURING THE COVID 19 PANDEMIC

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Abstract

The Covid 19 pandemic was declared at the very beginning of the summer term of 2020 and left online classes as practically only possibility to ensure the continuity of classes. In those completely uncertain circumstances and in a very short period of time, the faculties had to make decisions that would ensure a quick, accessible and as simple as possible solution to continue the classes in the summer term. At the Zagreb University of Applied Sciences (TVZ), online classes began within a week of the declaration of the Covid 19 pandemic. The decision makers at that moment primarily thought about what digital technologies were presently available to them and how students would adapt, while they paid much less attention to how it would affect the teachers who had to implement their decisions. The speed of adaptation of online teaching at each individual faculty, including at TVZ, primarily depended on the level of implementation of digital technologies already adopted in the existing teaching processes, but also on how convinced its teachers were that the pandemic would be short and temporary, or a long-term situation in which they would have to continue all their activities.

That's why it was interesting to check how the teachers at TVZ managed in that extraordinary situation. The research was based on a WEB survey with a sample of teachers who represent all TVZ studies and all natural, technical, and social subjects conducted in each study program. The survey questions were divided into several shorter thematic units, which were intended to investigate teachers' attitudes related to the perception of the quality of online classes, their teaching load, experienced social-psychological aspects during online classes, and desirable forms of institutional support.

The obtained results show that in each of these situations, the teachers tried to find optimal ways to successfully end the term and to create new evaluation rules that would ensure an objective assessment of the learning outcomes achieved by their students.

Most teachers believed that the pandemic would end by the beginning of the next academic year, and that classes would then continue "as before", but as in any crisis, there were also those who were aware of the possibility that the pandemic would last longer and who did their best to adapt to the new conditions of teaching. The most important challenges faced by TVZ teachers were the increased workload in preparing and holding online classes, the lack of digital competences, the uncertainty of the quality of online classes, especially during practical classes and laboratory exercises, and determining a fair method of assessment. No less important challenges for teachers on TVZ were further development of their digital competences, as well as the feeling of a lack of institutional support during online classes. In addition to all that, for most teachers online teaching resulted in an imbalance between private and professional life.

Now, at a time when the Covid-19 pandemic is no longer the main reason for having online classes, faculty administration and their teachers should continue to improve their digital competences, introduce new digital tools in F2F classes, while trying to ensure regular contact with their students, fellow teachers, and all other participants in higher education.

Keywords: online teaching, teachers' digital competences, Covid 19 pandemic, fair method of assessment.

1 TEACHERS AND THE PANDEMIC: ACADEMIC AND PSYCHOLOGICAL CHALLENGES

Like classical teaching, effective online teaching should primarily focus on pedagogy (andragogy), and only then on technology, without which online teaching would not be possible. The application of digital technology in teaching at higher education institutions is not new, as evidenced by the book "25 years of Ed Tech" (Waller, 2020), published during the Covid-19 pandemic, with a whole range of meta studies dealing with the application of digital technology in teaching in the period from 1994 till 2018. In this book, the author describes how digital technology can support, improve, and even create much more interesting learning environments than those offered by classical teaching, but this primarily depends

on the engagement and creativity of each teacher, but also on the digital competences and technological equipment of not only teachers, but also students.

At the same time, the author warns of the need for constant monitoring of students' private data during online classes and advocates a critical approach based on constant research into the application of new digital technologies and warns of the need for additional teachers' engagement and monitoring of trends on social networks. The combination of all these elements directly affects the communication between teachers and students, but also indirectly defines the quality of online classes. So, for over twenty years now, technology has been integrated in higher education teaching to a greater or lesser extent. The pandemic only further accelerated the pace of the already started digital transformation of faculties, requiring them to urgently activate available and appropriate digital technology to enable online classes, and from teachers to adjust the content and methods applied in holding their classes, as well as to create new approaches to assessment of student learning outcomes.

Most of the examples that Waller refers to were mostly part of a blended or hybrid way of teaching, where teachers most often questioned and tested the possibilities and limitations of using digital technology in teaching. Such a mixed or hybrid approach to teaching can be defined as a well-thought-out integration of F2F and online teaching experiences (Garrison & Kanuka, 2004) that offers a potential for improving the quality of teaching that has yet to be realized as a new challenge among teachers and students. Ten years later, a meta study titled "Blended Learning Over Two Decades " (Zhonggen, 2015) warns of the near inevitability of the adoption of this hybrid way of teaching as soon as possible. Based on 30 thoroughly analysed articles related to the definition, advantages, and problems of hybrid teaching, Zhonggen suggests to faculties that they should not ignore the advantages of using digital technologies in teaching, but rather try to orient themselves as soon as possible to carefully innovating their previous pedagogical approaches. In this sense, Zhonggen especially emphasizes the following conclusions related to the hybrid way of teaching:

- Constant improvements in hybrid teaching gradually lead to the improvement of teachers' pedagogical competences, thereby additionally ensuring a higher level of teaching quality (Graham, 2006);
- Teachers' attitude towards the application of hybrid teaching is primarily determined by their digital competence, that is, a higher level of digital competence of teachers is positively related to a clearer recognition of the advantages of the hybrid way of teaching (Kao & Tsai, 2009);
- The interactivity of students during hybrid classes has a positive effect on their approach to learning, additionally develops their communication skills and ensures a better understanding of the content and acquisition of new knowledge (Kember & Cheng, 2010);
- The process of introducing a hybrid way of teaching includes all participants who participate in the organization of teaching at faculties, creating not only new processes and approaches to teaching which are acceptable to both teachers and students, but at the same time facilitate further digital transformation of the faculty (Carbonell & Dailey-Hebert & Gijsselaers, 2013);
- Application of well-designed LMS systems (learning management systems) that faculties introduce into their teaching processes, encourages students to participate more actively in classes and work continuously, eliminating the possibility of only passively listening to the teacher (Dias & Diniz, 2013).

Online teaching was nearly the only alternative during the lockdown of educational institutions that allowed teachers to interact with students either in small or large groups (Maher, 2020). The results of research conducted by the Agency for Science and Higher Education (AZVO), an independent and internationally recognized agency responsible for supporting the development of the Croatian higher education system, show the impact of online teaching on students and teachers at faculties in Croatia. During 2020 and 2021, AZVO conducted a whole series of research with the aim of better understanding the impact of the pandemic on the experience of studies. For the purposes of this paper, it is important to highlight the results of the research entitled "Challenges in higher education during the COVID-19 pandemic and social isolation: experiences and needs of students and employees of higher education institutions" (Bezjak et. al. 2020), in which they investigate their attitudes towards the available digital competences, their perception of the achieved quality of online teaching, the perceived feeling of workload, personal experiences and the level of support from their faculties. Before presenting the most important results of this research that relate to teachers, and for the sake of their better understanding, it should be emphasized that the citizens of Zagreb (the largest higher education centre in the country, whose teachers make up the largest share of the sample in this research), were also hit by an

earthquake on 21st March 2020. At that moment, teachers as well as other citizens of Zagreb, in addition to anxiety, uncertainty and confusion in the circumstances of the pandemic, experienced additional terror, and many of them suffered minor or major damage not only to their homes, but also to buildings, including the infrastructure of numerous faculties.

The obtained results of this research indicate that most teachers (77%) during the summer term of 2020 were satisfied with the quality of Internet access, as well as access to the necessary materials from home (76%), which were the basic prerequisites for conducting online classes. As many as 86% of teachers were satisfied with their level of digital competences and considered that they had good knowledge of the application of e-learning technologies (87%). Despite this, 59% of teachers express the need for additional training in the field of digital pedagogy, and 54% of them in the field of application of modern ICT technologies. After initial difficulties, most faculties organized relatively quickly and started online teaching, trying to neutralize the differences between traditional and online teaching. The teachers point out that transition to online classes initially required them to invest a lot of effort in acquiring new skills and significantly more time to prepare classes. In order to motivate students to be interactive during online classes, the teachers needed to employ imagination, knowledge, and resourcefulness, which consequently resulted in a higher workload for teachers. When it comes to the workload of teachers, 46% of them believe that the workload of online teaching for them was greater than before the quarantine, 27% believe that it was the same, while 19% of them state that their workload of online teaching was less than before the quarantine. Teachers who feel that online teaching was not an additional burden for them, see online teaching as a useful experience and a challenge through which they acquired some completely new skills. The problem with the higher workload of online teaching is particularly emphasized by younger teachers due to the impossibility of uninterrupted work from home because of simultaneous care of their own children, who are at home instead of being in kindergarten or school. In addition to the expressed higher workload, teachers point out the lack of instructions specifically regulating online teaching and the importance of available support from IT services not only during the establishment and maintenance of online teaching, but also when conducting online exams.

In that initial period, teachers' perception of online teaching is that it is inadequate in the long term, primarily because it cannot replace direct contact with students. Therefore, it is not surprising that 21% of teachers are not at all sure about the existence of any advantages of online classes, while 18% of them participate in online classes solely because there is no possibility of teaching in a different way. Despite this, 69% of teachers are satisfied with the quality of their online lectures, while 54% of them express great concern about the quality of exercises (laboratory, clinical, field, etc.) for which online teaching is inappropriate. What also worried teachers during online classes was the lack of interaction with students. For 44% of teachers, this interaction was worse than before the quarantine, for 24% of teachers it was the same as before these extraordinary circumstances, while 28% of teachers believe that the interaction during online classes was even better than before. The teachers who think that online teaching enables students to be more interactive explain this by pointing out that students are able to put questions to the teacher more easily, and on the other hand the teachers' answering their questions is easier in the form of more frequently asked quiz questions or similar. Those teachers who think that online teaching impairs interaction with their students see the reasons for this primarily in the fact that not all the students possess adequate computers (they lack a camera, microphone, etc.), as well as in the absence of rules for conducting online classes, without which it is difficult to monitor which of the students only technically joined the class, and who truly follows. In order to improve the quality of online teaching, teachers need smaller groups of students, determination of universal rules for online teaching, support in the formation of a database of video materials and other innovative teaching materials suitable for the online environment.

The Agency for Science and Higher Education in Croatia also conducted a research on the topic "*Psychological functioning of teachers during the Covid-19 pandemic*" (Živčić- Bečirević et. al, 2021), which primarily related to the assessment of teachers in terms of observed changes in their own mental and physical health, satisfaction with the balance of work and private life, as well as how much the teachers felt understood and supported and helped by their institutions during online classes. In what ways did the teachers take care of their mental health and whether they thought about seeking professional psychological help during the pandemic are also topics covered by this research.

As much as 48% of the teachers who participated in this research felt moderately disturbed by the entire situation, while the situation was very or extremely burdensome for 28% of them. Almost half of the teachers who participated in this research (44%) had feelings of anxiety and/or depression during online classes that occurred more than before the quarantine. Bearing in mind the earthquake that additionally disturbed the teachers in Zagreb in the same period, such somewhat pessimistic attitudes of the

teachers are not unexpected. Although 41% of teachers are satisfied with the balance of private and work life during online classes, 43% of them express a certain level of dissatisfaction. This especially applies to teachers who are also parents of younger children due to the stress of holding their online classes and taking care of their own children in parallel, since they also attended classes from home.

The ability to manage time in these conditions comes to the fore, so it is not surprising that holding online classes on a daily basis resulted in occasional feelings of anxiety, depression, worry, fear, insecurity, and helplessness among some teachers. The teachers who participated in this research estimate that their physical health (35%) and mental status (33%) worsened during online classes. The one thing that raises optimism is that 67% of teachers in that period experienced understanding and support from their faculty. However, there are also those (33%) who think that they didn't receive any kind of support during online classes at all. Among these dissatisfied teachers, there were 13% of those who thought about seeking professional psychological help, and 6% actually requested it. All these results indicate that the exchange of mutual experiences with colleagues and the expression of understanding and support from their faculties are always necessary for teachers, especially during crisis situations like this one.

2 METHODOLOGICAL FRAMEWORK OF CONDUCTED RESEARCH

The research entitled *"Experience and satisfaction with online teaching and working from home"* was conducted using a WEB survey during May 2021 when Zagreb University of Applied Sciences (TVZ) continued to hold online classes due to the Covid-19 pandemic. TVZ offers four different undergraduate and graduate study programs in the fields of Informatics and Computing, Electrical Engineering, Mechanical Engineering and Mechatronics, and Civil Engineering.

The sample consists of 74 teachers, of which 47 are full-time employees at TVZ, while the rest are external associates who participate in conducting online classes. Among the teachers who participated in this research, the majority are men (64%), middle-aged (40-50 years old), with many years of experience in teaching. As many as 66% of employed teachers and 48% of external associates have more than 10 years of work experience at TVZ.

All these teachers are representative of all studies held at TVZ, so among them there are 38% of teachers involved in holding online classes for students of Informatics and Computing, 27% of Electrical Engineering, 20% of Mechanical Engineering and Mechatronics, and 15% of teachers participating in online classes for Civil Engineering students. In accordance with this structure of study programs, teachers of natural and technical subjects are, as one might expect, the best represented in the sample (76%), while the rest of the teachers hold classes from the social group of subjects.

The survey questions were divided into several shorter thematic units, which were intended to investigate teachers' attitudes related to the perception of the quality of online classes, their teaching load, experienced social-psychological aspects during online classes, and desirable forms of institutional support.

A scale from 1 to 5 was used to assess individual teachers' attitudes, where 1 is the lowest and 5 is the highest grade. The collected data were analysed using the computer statistical program SPSS 20.0, which is intended for social and economic research.

3 RESULTS OF CONDUCTED RESEARCH

If they were in a situation where they could choose again what they would do, employed teachers at TVZ (64%), but also external associates (67%) would be teachers again. What differentiates them from each other are the reasons. Employed teachers emphasize that being a teacher is their life choice (43%), while external associates indicate their specific professional knowledge that they want to pass on to students as the most important reason (63%). The reasons why teachers want or do not want to be teachers are best expressed by the following selected quotes:

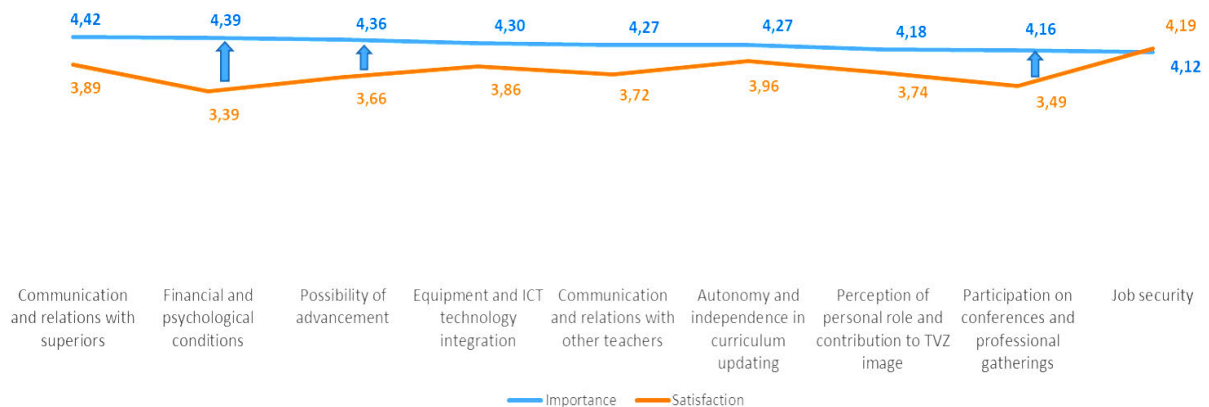
- *"I like to impart knowledge to young people that I believe they will need in their future professional life. I like to see their satisfaction when they learn or successfully master something new, and I like to constantly do something new and follow our compulsive profession and innovations."*
- *"I would be a teacher again because it is my calling in life. Students are the force that will change the future of all of us, and by transferring knowledge to them, we make that task easier for them."*
- *"Independence in work, interdisciplinarity and freedom of organization of working time are important factors that would make me become a teacher again."*

- "Teachers are underpaid in relation to their responsibilities and duties."
- "The management of the college does not appreciate the work and effort of the teachers that are invested in order to introduce students to the professional world."
- "There is a lack of up-to-date professional knowledge among teachers, which creates a bad atmosphere."

In contrast to external associates, teachers employed at TVZ are more motivated for additional work with their students, they are more involved in scientific and professional work, and participate more in the realization of various joint projects of TVZ and the economy. In the assessment of satisfaction with certain elements of cooperation with technical and supporting services, where a scale of 1 to 5 was used (1 is the lowest and 5 is the highest grade), no statistically significant difference was found between the employed teachers and the external associates. During the pandemic of Covid-19 and working from home, teachers best maintain cooperation with the secretaries of individual studies (4.47), the Information Technology Support Centre (4.38), Student Services (4.31) and with the Heads of individual studies (4.30). Teachers are slightly less satisfied with the cooperation with the Accounting (4.03), the Dean's Office (3.61) and the Legal and Personnel Service (3.58).

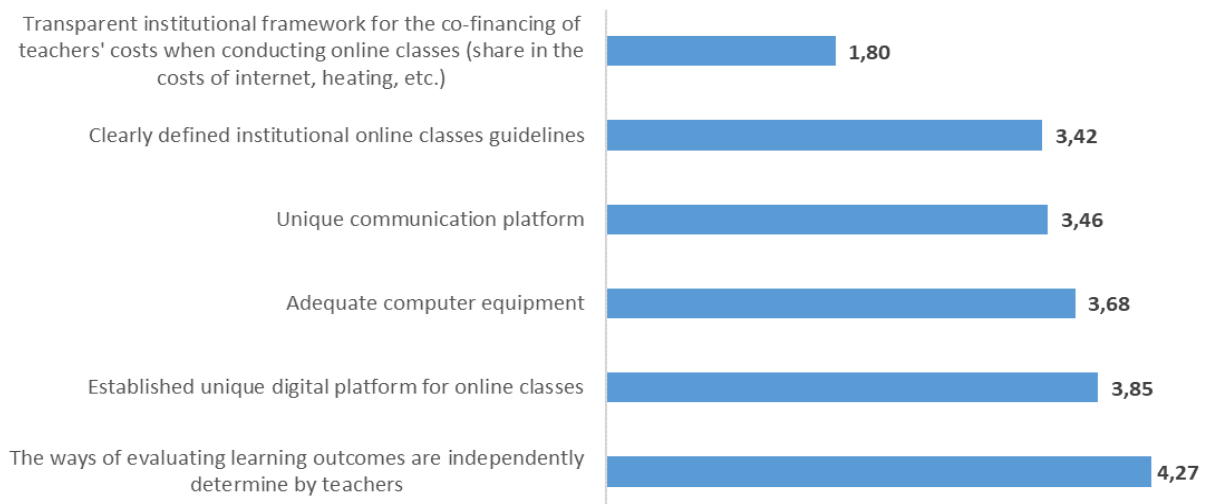
The cooperation between teachers and Student Services during online classes was additionally exposed to various challenges, so it was interesting to examine in more detail the reasons for satisfaction and dissatisfaction with their cooperation. The teachers are particularly satisfied with the availability, kindness, responsiveness, speed of handling documentation and timely transfer of information by the employees of the Student Services. What particularly bothered them in that cooperation were only sporadic examples related to the discrepancies of information between different employees and the loss of application forms after the exams.

In order to improve the satisfaction and motivation of the teachers, the teachers expressed their opinion on the predefined elements regarding their importance and satisfaction (Graph 1). According to teachers' opinion, the importance of all given elements is greater than their satisfaction, except when it comes to job security, that the teachers are more satisfied with than they expected in the current crisis. Space for improvement in the satisfaction and motivation of its teachers Zagreb University of Applied Sciences can primarily provide in securing better salaries, faster advancement and more frequent participation in conferences and professional gatherings.



Graph 1: Importance and satisfaction on teacher motivation. Source: "Experience and satisfaction with online teaching and working from home", Internal research project, Zagreb University of Applied Sciences, Bračun & Pauković & Horvat, 2021

In addition to job security, the teachers at TVZ are most satisfied, by far, with the freedom they have in working with students. They are less satisfied with the choice of digital platform for online classes (MS Teams), the integration of equipment and the unique communication platform, as well as the lack of clearly defined rules for online classes. Teachers are extremely dissatisfied with the complete absence of any transparent institutional framework for co-financing costs when holding online classes from home (Graph 2).

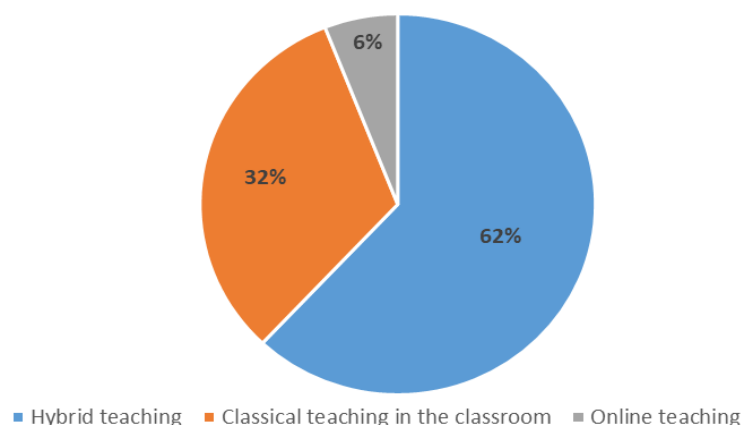


Graph 2: Satisfaction with institutional support during online classes. Source: "Experience and satisfaction with online teaching and working from home", Internal research project, Zagreb University of Applied Sciences, Bračun & Pauković & Horvat, 2021

When it comes to institutional support during online classes, it is especially important to pay attention to the openly expressed views of teachers, among which the following quotes stand out:

- "There is a lack of concrete supervision over the quality of online classes and concern for the development of young assistants and teachers."
- "The lack of communication, teamwork and support from the administration while working from home leads to a demotivating atmosphere among teachers."
- "There is a lack of continuity in the communication of the goals of online classes and a clear strategy for their realization."
- "Unequal distribution of additional work among teachers."
- "The procedure for the advancement of teachers during online classes was additionally prolonged, primarily as a result of the slowness and incompetence of the Legal Personnel Service."

If the epidemiological situation allowed it, teachers would, if they were able to choose during the Covid-19 pandemic, prefer to apply a hybrid way of teaching their subjects (62%), given that to a certain extent it compensates for the lack of live contact with students (Graph 3).



Graph 3: Preferences to certain forms of teaching during the pandemic. Source: "Experience and satisfaction with online teaching and working from home", Internal research project, Zagreb University of Applied Sciences, Bračun & Pauković & Horvat, 2021

As in other research on the subject, according to the teachers at the Zagreb University of Applied Sciences, online teaching requires significantly more engagement from them than live teaching. Although classes at TVZ continued as scheduled after the declaration of the Covid-19 pandemic, almost

without any interruption between F2F and online classes, teachers still needed some time to get used to new conditions of holding classes. In order to improve the quality of online classes, despite the additional workload, they tried to devise new approaches to online learning for their students, and soon provided them with permanently available recordings of all online lectures and exercises, which made it much easier for the students who themselves often missed online classes due to illness to follow and adopt the teaching content and to adapt to new conditions of checking learning outcomes.

As one of the teachers at Zagreb University of Applied Sciences back in 2015, I participated in the pilot project of integrating the Merlin system (a version of the LMS system) into the teaching of my subjects. Merlin enables teachers and students of the faculty who implement it to hold classes with the application of e-learning technologies, which is based on the Moodle open-source system, which the team of the e-Learning Centre "Srce" (University Computing Centre in Zagreb) has further elaborated and adapted to teachers at TVZ. The Merlin virtual environment consists of an e-learning system, a webinar system and an e-portfolio system and is connected to the Croatian ISVU system (University Information System). A very small number of teachers participated in that pilot project, although most of them at the TVZ are from the technical group of subjects, which is why the introduction of new technologies into teaching should not be a particular obstacle for them. After I was personally convinced of the possibilities and effectiveness of LMS system Merlin, which was also well accepted by the students, after completing the pilot project in all my courses, I continued to use it. This experience proved to be great help to me when switching to online classes during 2020, without increasing my teaching load to the same extent as felt by fellow teachers who had no experience working with Merlin until then and had to switch to teaching online during the Covid-19 pandemic.

4 CONCLUSIONS

During 2020 and 2021, the Covid-19 pandemic had a huge impact on every individual, on developed and underdeveloped economies, and also on the way teachers taught students and how students gained new knowledge and experience during online classes. The existing digital tools, which until then were only used sporadically in classes, became solutions for mitigating non-attendance of classes during the quarantine. Teachers rapidly acquired new digital competences in order to face changes in their current teaching methods as successfully as possible. As in most countries, the implementation of online classes at Croatian faculties, including Zagreb University of Applied Sciences (TVZ), has significantly accelerated their process of digital transformation.

During the implementation of online teaching, which was introduced almost "overnight" at most Croatian faculties, teachers and students shared their experiences with online teaching through social networks and through participation in scientific research. Analysis of these results confirms that most teachers needed some time to adjust during the transition from F2F to online teaching, almost the same as their students. In that process, both of them recognized the stimulating and useful aspects of online teaching, but also other, unfavourable aspects of this virtual way of teaching. It was precisely these unfavourable aspects of online teaching that were first noticed by teachers, who were aware that the basic framework of online teaching needs to be further developed and adapted to certain specifics of the teaching content. Teachers found the motive for constant progress and adaptation to new conditions that online teaching set before them in their original motive for practicing this profession, which many perceive as their life calling.

The crisis in which all participants of higher education found themselves, directed them even more towards each other. This was especially important for the cooperation between teachers and Student Services, which directly connects them with each of their students. The results of the research entitled "*Experience and satisfaction with online teaching and working from home*" carried out through an internal project at Zagreb University of Applied Sciences (TVZ) indicate that this collaboration was extremely successful. TVZ teachers expressed their satisfaction with the availability, kindness, responsiveness, and quick resolution of various challenges, as well as the timely transmission of important information by the employees of the Student Services. What bothered their teachers were only sporadic examples that did not impair the high level of satisfaction with cooperation with the Student Services.

The teachers at TVZ expressed great satisfaction with the security of their workplace, but also with the available digital platform for online classes (MS Teams) and the integration of equipment and a unique communication platform, all of which is the result of institutional support. But teachers still have unfulfilled expectations from TVZ. What they still lack are clearly defined rules for online classes and conditions for co-financing costs during their work from home, which were completely neglected.

Although at the beginning there was great doubt about the effectiveness of online teaching, after some time both teachers and students found good enough arguments for its applicability in these times of

crisis. What has remained a constant objection to online teaching is the fact that it cannot be an adequate substitute for personal contact, especially in the long term. Personal contact is necessary not only between teachers and students, but also between teachers. Therefore, it is not at all surprising that teachers, if they were able to choose how to conduct classes during the Covid-19 pandemic, would prefer to choose a hybrid method of conducting classes, because it compensates, at least to some extent, for the lack of live contact with students and other colleagues at the faculty.

As in many research results on the topic of online classes, according to the teachers at Zagreb University of Applied Sciences, online classes require significantly more engagement from them compared to live classes. The teachers readily accepted this additional commitment. Now, at a time when the Covid-19 pandemic is no longer the main reason for having online classes, faculties and their teachers should continue to improve their digital competences, introduce new digital tools in classes, while trying to ensure regular contact with their students, fellow teachers, and all other participants in higher education.

In order for the continuation of the started digital transformation to be as transparent and successful as possible, based on the results of this research, recommendations related to Zagreb University of Applied Sciences would go in the direction of setting:

- Institutional framework of support for all participants of teaching and non-teaching processes that will enable them to have an even better connection with each other
- Standards of teaching quality, including the possibility of new crisis situations
- Recommendations for the application of the merlin system as an accessible and adaptable lms system and
- The implementation of continuous teacher education, which, in addition to the pedagogical one, will also be aimed at improving their digital competences.

In this way, Zagreb University of Applied Sciences will much faster adapt to the expectations of students who are impatiently waiting for visible results of the digital transformation of their faculty and the application of new digital tools in teaching, than was the case before the Covid-19 pandemic.

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