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THE QUALITY OF ONLINE TEACHING DURING THE COVID-19 PANDEMIC⁴⁶

Abstract: Striving to change the paradigm of education has always been an imperative in our society. It had its full echo during the pandemic caused by the Covid-19 virus. In this context, our educational system had to adapt quickly to changes in a way that has no consequences for the implementation of teaching and especially its quality. In Serbia, the entire school system from primary schools to colleges has undergone crucial changes that have been reflected in the sudden transition from traditional to virtual classrooms with the help of various electronic platforms. The subject of this empirical research is reflected in the examination of the quality of university teaching. The focus of this research was successful on examining and assessing the quality of teaching, the advantages and disadvantages of online teaching, the attitude of teachers and students towards the conceptual implementation of online teaching through the most commonly used e-platforms. This issue has been studied from the perspective of university teachers and associates of the Faculty of Philosophy, University of Niš, with the difficulty of seeing the benefits and limitations of online teaching in pandemic conditions. The paper uses a descriptive method, scaling technique and the Liker-type Rating Scale instrument (JOZJMAN-Covid-19) constructed for the purposes of this research, the consistency and reliability of which were tested by the Conbach Alpha test. The obtained research findings are considered in relation to the independent variables of the research: teachers of social sciences, humanities and philology, and in relation to the title of university teacher. The results of the research are presented in tables and graphs with the help of descriptive and parametric statistics parameters.

Keywords: Teaching quality, University teaching, Change and innovation, Covid-19

Introduction

The declaration of a pandemic caused by the appearance and spread of the coronavirus in March 2020 directly affected the changes in the educational systems of almost all countries in the world. In just a few days, teachers / professors and students were forced to move from their traditional classrooms to virtual ones, created via e-platforms (such as *Microsoft Teams*, *Zoom*, and *Google Hangouts Meet*). This unexpected change marked the beginning of a challenge to reestablish order within the changed education system. "The transition from the traditional method to online teaching was fast – overnight, teachers and students were forced to adapt to new circumstances" (Novaković, 2021, p. 106). Namely, important pedagogical, social and economic issues of how justified this type of realization of the teaching process have crystallized. The results of a large number of studies suggest a positive impact of online learning on the quality of teaching and the achievements of students (Baby & Sridevi, 2018; Lapitan et al., 2020), but there are also studies that suggest that online learning does not offer comparable or better results relative to the traditional (classroom) type of teaching (Galy et al., 2011; Thomas and Rogers, 2020; Omodan, 2020; Hodges et al., 2020; Kulikowski et al., 2021),

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especially the reduction of motivation, interactions and focus on classes (Dhull & Saksh, 2017; Yusuf & Ahmad, 2020). However, considering the predictions that by 2025 it will become the dominant form of teaching (Shailendra et al., 2018), it is extremely important to consider the attitudes and opinions of all participants in the teaching process – both teachers and students, as well as professors and university students, because it is the only way to produce practical solutions to improve both its quality and the degree of satisfaction shared by staff and students. During the two-year pandemic, researchers and scientists looked at students' attitudes towards online teaching (Novaković & Božić, 2020; Prodanović & Gavranović, 2020; Đorđević et al., 2020; Butunaru et al., 2021; Mutuprasad et al., 2021; Chakraborty et al., 2021), while there are far fewer who analyze the opinion of teachers, especially university professors, on crucial issues of organization and implementation of online teaching.

It is important to remember that the contemporary forms of online teaching were introduced at the beginning of the 21st century, when online courses were first organized. Duffy & Kirkley (2001) and Garrison & Anderson (2003), note that at the beginning of the new millennium, the first trainings were organized to prepare teachers for online teaching, followed by the first online courses (Allen & Seaman, 2008; West, Waddoups, & Graham, 2007; Aspden & Helm, 2004; Barker, 2003). A number of studies have noted that teachers who teach online have a much more complex task than teachers who teach in the traditional classroom (Baran, Correia & Thompson, 2011; Barker, 2002; Bawane & Spector, 2009; Berge, 2001; Goodyear et al., 2001). Baran et al. (2011) note that the online environment is changing the nature of the interaction between teachers, students and content, with teachers again trying to adopt new and more accessible approaches.⁴⁷ Timely planning and adjustment of online teaching is an indispensable factor in the effectiveness of online teaching (Lloyd et al., 2012). Simon (2012) in his experimental research “The impact of online teaching on higher education faculty’s professional identity and the role of technology: the coming of the age of the virtual teacher” asserts that teachers who taught online courses were not satisfied with their potential, believing that it cannot replace the traditional form of teaching. Vingo et al. (2017) expressed concerns concerning the productivity of students during online classes, emphasizing the need for technical assistance in the implementation of this type of teaching. Chin et al. (2018) point out that the biggest challenge for university professors is the lack of skills and experience for teaching in an online environment,⁴⁸ while Xaferi et al. (2018) note that teachers disagree that the traditional form of online teaching should be replaced. Davis et al. (2019) believe that barriers to the complete implementation of online courses are expectations set by the traditional (classroom) method of teaching, lack of feedback from students and reduced interpersonal connections.

Regardless of the previously mentioned attitudes and beliefs regarding the effectiveness of online teaching, with the beginning of the pandemic, teachers had to take on many roles “overnight”, realizing teaching in the online environment, which is why the concept of “digital pedagogy” comes to the fore, in which “formation and improvement of digital competencies of the teachers” appears as its primary component (Toktarova & Semenova, 2020). Johnson et al. (2020) note that university professors, whether or not they had previously taught online courses, had been able to adapt quickly to the new environment. Even those who were opposed to technologies in education quickly developed skills suitable for online teaching, through the use appropriate tools (Shenoy et al., 2020). Most instructors began experimenting with the new approach as they did not have the opportunity to teach using the technologies of distance education before the pandemic (Bonk, 2020). Rapanta et al. (2020) mention that during the pandemic which was caused by the emergence and spread of the virus, many “tips and tricks” for teachers appeared, none of which had been not applicable in the absence of the necessary experience of working in an online environment. In his study “Teachers’ Attitude Towards

⁴⁷ As early as 2001, Berg recognized four roles of teachers in the online environment: 1) teaching; 2) socialization, 3) organizing and 4) integrating technology.

⁴⁸ The teacher appears in two roles: the designer of the teaching process and the one who implements it (Goodyear & Dimitriadis, 2013).

Online Learning During the Covid-19 Pandemic in Indonesia” (2020), Hermanto noted that 52.1% of the teachers surveyed do not have any problems with online teaching, but that only 23.9% are satisfied with the online teaching environment. Moralista et al. (2020) in the study “Faculty Perception towards Online Education in a State College in the Philippines during the Coronavirus Disease 19 (COVID-19) Pandemic” says that online education in colleges is characterized by a higher degree of academic dishonesty and impersonality, with compound with technical difficulties. The results show that there is a statistically significant difference in the answers of respondents relative to age, gender, academic status and years of employment, with opinions generally divided on the effectiveness of online teaching, which is a consequence of confused feelings about the new circumstances. Analyzing the attitudes of university professors towards online teaching, Pena et al. (2021) in the paper “Professors’ Expectations about Online Education and its Relationship with Characteristics of University Entrance and Students’ Academic Performance During the COVID-19 Pandemic” reveal that 84.9% of surveyed professors responded that they have improved their skills for online courses, while from the beginning of the pandemic until the moment of research, their positive attitude towards online teaching remained the same. Due to this, Fauci and Kusuma (2020) find that 80% of teachers are dissatisfied with online teaching, both due to technical problems and the inability to plan, evaluate and adapt, while Kirikur (2021) seeks to determine whether practical work at home can provide equivalent learning experiences as learning in a laboratory setting. Lee and Young (2021) in their paper “Instructional Changes Instigated by the University Faculty during the COVID-19 Pandemic: The Effect of Individual, Course and Institutional Factors” reveal that teachers have functionally improved and modified existing courses as part of adapting to online teaching, without introducing special innovations into the teaching process. The difference in relation to the traditional (classroom) type of teaching was the change in behavior conditioned by the use of technology. The results of this study are fully compatible with the results of research by G. Lorenzo from 2008, in which he concluded that higher education is often slow to adapt to new tools and innovations.⁴⁹ In addition to the above, Peša & Kamarova (2021) in their study “Socio-psychological Problems of the Transition of University Teachers to Distance Employment During the Covid-19 Pandemic” singles out social isolation associated with lack of communication as the biggest socio-psychological problem of university professors with participants in the teaching process of all ages.

Despite the existence of several studies, very little is known about the attitudes of university professors towards online teaching. Therefore, in this paper we will try to look at the attitudes of university professors and associates of the Faculty of Philosophy at the University of Nis regarding the quality and important aspects of online teaching. That is why it was necessary to conduct a research in which the opinions of teachers, especially university teachers, towards online teaching will be examined, with the aim of better understanding the way a “new” type of teaching works and how it can be improved improvement.

Methodology of the Research

The subject of the study is the examination of the attitudes of university teachers and associates on the quality of teaching during the Covid-19 pandemic, with the aim of examining the strengths and weaknesses of teaching in the field of higher education. In accordance with the subject and goal of the research, the following research tasks were conceptualized: 1. assessment of the quality of online teaching, 2. assessment of the relationship between teachers and students according

⁴⁹ Over the last twenty years, several studies have evaluated the factors influencing the acceptance of online teaching: support from institutions (Moore & Anderson, 2003; Sumrall, 2002), individual characteristics of the participants (Granic & Marangunic, 2019; Tatcher et al., 2007; Agarwal & Prasad, 1998), socio-demographic characteristics such as gender, age, experience and intrinsic motivation (Allan & Seaman, 2012; Chapman, 2011; Ko & Rossen, 2003; Shea, 2007).

to the conceptual realization of online teaching through the most frequently used platform at the Faculty of Philosophy. 3. assessment the advantages and disadvantages of online teaching.

Procedure and Instruments

Research on the quality of online teaching was conducted in April 2022. A descriptive method was used to assess the characteristics of online teaching from the perspective of university teachers. To measure the degree of the properties that are the subject of this research, the scaling technique was used with the measuring instrument of the Likert-type assessment scale with response modalities from 1 – I do not agree at all to 5 – I completely agree.

For the purposes of the presented empirical research, the Cronbach alpha (α) coefficient was used, which is used to measure the reliability of the measuring scale. This parameter examined the internal consistency of the measurement scale where Cronbach’s Alpha is $\alpha = 0.99$. With this measurement result, we can conclude that the Likert type assessment scale constructed exclusively for the needs of this research is reliable and that it satisfies one of the basic metric characteristics of research instruments.

The instrument was distributed to teachers of the Faculty of Philosophy, University of Nis, in the form of a Google questionnaire and the findings we obtained through this instrument were collected from respondents who voluntarily participate in this research.

Participants

Respondents who make up the sample were informed about the context of this study and were familiar with its ethical aspects. The sample has the characteristics of convenience sampling, is based on a voluntary basis for participation in the research and was completely anonymous. For the purposes of this research, we collected 60 respondents who expressed their perceptions about the quality of online teaching during the Covid-19 pandemic. The presented research does not generalize data to the entire population of university teachers.

Method of Data Collection

Statistical data processing was performed through the SPSS program, and the following statistical parameters were used in the statistical analysis: Cronbach’s Alpha test, parametric statistics with t-test and F-test parameters. The results are presented in tabular and graphical charts.

Research results

Although online learning and teaching is not a novelty in education, it may now prove more necessary than ever. It is a form of teaching which is conducted on an online platform, through digital technologies. Below are the views of university teachers and associates on this issue.

Table 1

Perceptions of university teachers about online teaching relative to gender

Gender		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Male	M	1.00	2.20	1.20	1.00	2.20	1.05	3.10	2.15	1.00	3.40
	N	20	20	20	20	20	20	20	20	20	20
	SD	.00	1.00	.41	.00	.89	.22	1.16	.93	.00	.68
Female	M	1.32	4.62	3.60	2.90	4.35	2.35	4.82	4.42	2.45	4.85
	N	40	40	40	40	40	40	40	40	40	40
	SD	.94	.49	.92	1.29	.69	.483	.38	.50	.67	.361

$t = -11.92; df = 58; p = 0.0001$

Table 1 provides the individual answers of male and female respondents about online teaching during the Covid-19 pandemic (*T1 – Before the emergence and spread of the corona virus, I taught online; T2 – I prefer the traditional (classroom) type of teaching in relation to online type teaching; T3 – It took me time to get used to the online working conditions; T4 – I needed additional practice for the realization of online classes; T5- I improved my digital competencies at the beginning of the pandemic; T6 – I regularly encountered technical problems; T7 – Online platforms (Hangouts Meet, Zoom, Microsoft Teams, etc.) through which classes were conducted served their function; T8 – Online teaching is suitable for the realization of theoretical teaching; T9 – Online teaching is suitable for the implementation of practical classes; T10 – I have adapted my courses to the realization in the online environment*).

The research findings show that online teaching did not take place before the spread of the pandemic, but also that teachers did not need a lot of time to get used to the new way of working and that they did not need additional practice for online teaching. In general, male teachers believe that they had digital competencies even before the pandemic caused by Covid-19. Summarizing the answers from Table 1, there is a noticeable disagreement that online teaching is suitable for conducting theoretical and practical classes. Male teachers are undecided about claiming that online platforms are functional and that they have managed to adapt their courses in an online environment.

We can see slightly different attitudes based on the arithmetic of female responses, which show that they prefer the traditional approach to teaching, that they have improved their competencies during the pandemic, and that online platforms are functional, but that theoretical teaching is suitable for online by the way. The parametric type of testing, t-test on a smaller sample, shows a statistically significant difference in the attitudes of male and female respondents. By calculating the answers of the respondents in the SPSS program, a statistically significant difference was obtained, $p < 0.05$, $p = 0.0001$ and that the female respondents grade the statements higher than the male respondents.

The statements were also tested relative to another independent variable related to the scientific field of the university teacher. Comparing the means of the answers of the teachers of philological and social-humanistic sciences, it is noticeable that the attitudes towards items from T1 to T10 are more positively evaluated by the teachers of social-humanistic sciences. T-testing revealed differences between the answers of respondents in philology and social sciences and humanities, where it was found that teachers of social sciences and humanities preferred traditional forms of teaching, showed difficulties in adapting to the new situation and that they needed additional help to implement online classes, and so they perfected their digital competencies during the pandemic. Also, teachers of social sciences and humanities believe that the online platform was functional and feasible for the implementation of practical classes and that they managed to adapt their courses in the online environment. Views of teachers of social sciences and humanities differ significantly from teachers of philological sciences, $p < 0.05$, $p = 0.0001$.

Statements about the concept of conducting online teaching were also tested with regard to scientific title. Regardless of the fact that the sampling did not include a homogeneous distribution of respondents in relation to scientific titles, Fisher's test determined that there is a statistically significant difference in the answers of respondents with regard to a given independent variable. The differences are statistically significant, $p < 0.05$, $p = 0.001$. F test and measurement of arithmetic means showed an increase in positive attitudes about the given items, which are grouped into a single variable, and can be seen from the lowest to the highest titles (researcher $M = 44.33$, Teaching associate $M = 40.60$, Teaching assistant $M = 39.00$, Teaching assistant with PhD $M = 36.00$, Assistant Professor $M = 32.75$, Associate Professor $M = 26.10$, Full Professor $M = 16.85$).

Online teaching can be very successful if interaction is provided through adequate teaching methods and efficient use of web assets and applications. It is certain that the means of information and communication technologies offer unlimited possibilities for creative activities that enhance

the dynamism and exchange of opinions of students and thus affect the greater efficiency of teaching. The results refer to the survey of respondents' attitudes about the following statements: *T11 – Online teaching had a positive impact on the achievements of (my) students during the pandemic; T12 – Lack of physical contact has a negative effect on student achievement; T13 – Online teaching requires more discipline on the part of students; T14 – During online classes, interaction with students was at a high level; T15 – It was significantly more difficult for me to motivate students to actively participate in teaching; T16 – During online classes, interaction among colleagues was at a high level; T17 – A considerable issue in online teaching was the students not using their cameras; T18 – A big problem in online teaching was the students not using their cameras; T19 – I keep the camera on all the time during my online classes; T20 – Students prefer communication via text messages (over live oral communication).*

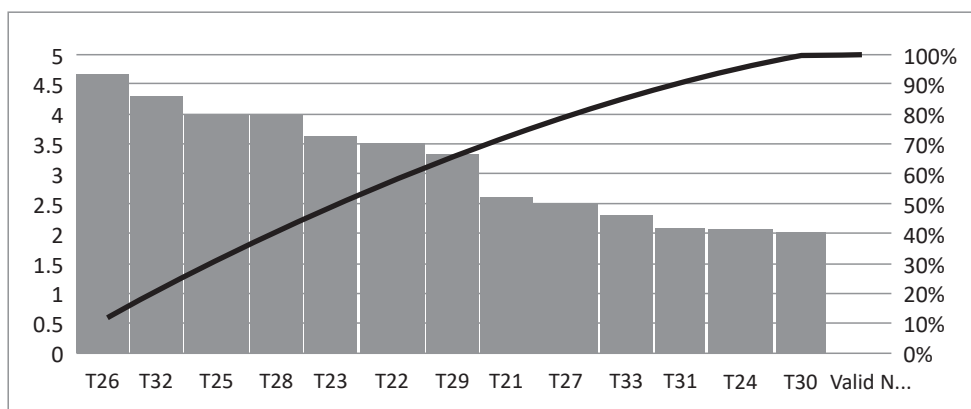
Disagreement towards uncertainty is dominant on most of the stated statements, $M = 2.00$; $M < 3.00$. A greater degree of agreement is noticeable in the attitudes that the lack of physical contact probably affected lower academic achievement, that online teaching requires more discipline among students, that it is more difficult to motivate students to actively participate in online teaching, and that students commonly do not use their cameras while all university teachers keep the camera on during lectures, $M = 3.00-4.00$.

Parametric testing and application of the t-test displays statistically significant differences in the respondents' answers about the attitude of teachers and students towards the conceptual realization of online teaching relative to gender. By grouping the items a unique variable was created that tested the differences in responses with respect to gender. Comparing the means of the answers, it is noticeable that the answers of the female respondents ($M = 39.35$) differ significantly from the male respondents ($M = 15.35$). The difference is statistically significant ($t = -13.90$; $df = 58$; $p = 0.0001$).

A similar finding can be seen relative to the variable scientific field. Parametric testing and application of the t-test examined statistically significant differences in the respondents' answers about the attitude of teachers and students towards the conceptual realization of online teaching with regard to the scientific field of teachers. Comparing the arithmetic means of the answers, it is noticeable that the answers of the respondents from the field of social sciences and humanities ($M = 46.44$) are significantly different from the respondents from the field of philological sciences ($M = 25.86$). The difference is statistically significant ($t = -12.05$; $df = 51.48$; $p = 0.001$).

Graph 1

Benefits and limitations of online teaching from the perspective of university teachers



Fisher's test examined the attitudes of university teachers about the views of teachers and students towards the conceptual realization of online teaching with regard to the scientific title. ANOVA F-test reveals a statistically significant difference in the answers of the respondents with regard to the stated independent variable. In this case, too, it is noticeable that respondents who have a hierarchically lower title have more positive attitudes towards higher titles (researcher M = 48.50; teaching associate M = 46.60; teaching assistant 43.50; teaching assistant with a Ph.D. M = 40; assistant professor M = 35.75; associate professor M = 26.90; full professor M = 13.43). The difference is statistically significant at the level of statistical significance, $F = 185.39$, $p = 0.001$.

Many universities have had difficulty adapting online and virtual platforms for the needs of classes, and academic staff had not been fully trained in digital technology. Accustomed to traditional teaching, teachers had to change and adapt their work to the conditions of online teaching and achieve the intended learning outcomes and goals. Graph 1 shows the attitudes of the respondents about the following statements: *T21 – It took me longer to prepare for my classes; T22 – I used various online teaching tools; T23 – I can create electronic interactive materials for students; T24 – I regularly use the electronic whiteboard (as part of work in virtual classrooms); T25 – I use presentations regularly during my classes; T26 – I share my teaching materials with students; T27 – Exams during online classes are more difficult for students; ; T28 – It is more difficult to take exams in an online environment; T29 – I think that during online classes students had an easier access to me compared to the time when I taught in a (traditional) classroom; T30 – I had negative experiences working in an online environment; T31 – I was faced with the lack of adequate space for classes from home; T32 – I would love to return to the traditional classroom; T33 – I believe that online teaching will replace the traditional (classroom) type of teaching in the near future.* By examining the graph, it is possible to analyze the range of arithmetic means in a ranked sense, from the most positive to the most negatively evaluated responses to these statements. Among the above claims, university teachers and associates give a positive answer to share their materials with their students ($M > 4.50$), they mostly agree that they would be happy to return to the traditional classroom but state that they regularly use presentations during their lectures. University teachers reveal that it was much more difficult to conduct exams in the online environment compared to regular conditions. Their predominant agreement on the Likert scale is expressed in the view that they know how to create electronic materials and that they used various online tools during online classes. Teachers did not have much trouble finding space at home to teach and do not agree with the statement that they were not inaccessible to students during the Covid-19 pandemic. The adaptability of online teaching as one of its greatest advantages is reflected in the production of greater opportunities for individualization of teaching as a requirement of contemporary education. Thanks to the Internet, students can access an ocean of information that will be valuable for them to master knowledge from various fields.

The results analyzed in Graph 1 are grouped into a single variable that has been transformed into a variable globally related to the attitudes of university teachers about the benefits and limitations of online teaching. The T-test determined that this research task also showed a statistically significant difference with regard to gender, where women ($M = 49.52$) are more aware of the benefits and limitations of online teaching compared to men ($M = 25.10$). The difference is statistically significant at the level of statistical significance, $t = -11.55$; $df = 58$; $p = 0.0001$.

Similarly to the previously analyzed segments of this study, there is a noticeable difference in the responses of the participants and with regard to the scientific field. All scientific fields are highly specific, implying a specific approach to teaching and content analysis, so it is not surprising that there are differences in the attitudes of university teachers in the field of social sciences and humanities ($M = 57.75$) and the university teachers of philology ($M = 35.43$). The difference is statistically significant at the level of statistical significance, $t = -11.29$, $df = 57.82$, $p = 0.001$.

Differences in the answers of the respondents are also noticeable considering the socio-demographic characteristics among the participants. The attitudes of full, associate professors and assistant professors differ from teaching assistants, teaching associates and researchers. The advantages and disadvantages of online teaching are differently perceived, probably with regard to work experience, and the title can certainly affect the critical perception of this way of working in relation to young associates who are likely to adapt quicker and more easily to novel situations. The difference is statistically significant at the level of statistical significance, $F = 140.81$; $df = 6$; $p = 0.001$.

Discussion and Conclusion

Teachers have become engineers and implementers of online courses, regardless of whether they advocated for the use of computers and mobile phones in teaching or strongly opposed it before the pandemic. Teachers who had prior experience, i.e. possessed digital competencies, relatively easily adapted to the new circumstances, while, unfortunately, it was much harder for those teachers, digital immigrants (Prensky, 2001), who did not want to accept the use of computers and mobile phones in teaching, believing that modern information and communication technologies cannot help achieve better teaching results (Novaković, 2021). It was not easy for students, on the other hand, to accept change and get used to the new teaching environment, even though they belong to the generation of digital natives (Coman et al., 2020). Both the benefits and disadvantages of online teaching quickly showed themselves.

In the research presented, the results show that the teachers of the Faculty of Philosophy, University of Nis, did not have the opportunity to express their views on whether online teaching systems should be implemented, but they acted very professionally and quickly adapted to the circumstance. Attitudes are divided in terms of which contents are suitable for teaching and which are not, but they do agree that theoretical teaching is suitable for online teaching, practical teaching. The views of university teachers about online teaching differ according to gender, scientific field and scientific title, therefore the first hypothesis was confirmed. Social distancing and increased stress are elements that could have a negative impact on student satisfaction and social skills, i.e. the level of motivation in learning. There was also the question of ensuring the quality of online teaching given the speed of adaptation to changes caused by the pandemic, and it was not possible to ignore the risks that the pandemic posed to students and university teachers. The research showed that teachers have a very clear attitude when it comes to the attitude of teachers and students towards the conceptual realization of online teaching. Teaching was realized without any problems, but there was an obvious lack of interaction with students, which is causally-consequential with their motivation to learn and therefore their poorer academic achievement. Statistically significant differences with regard to the socio-demographic characteristics of the respondents were also noticed when examining the relationship between teachers and students, and the second research hypothesis was confirmed.

Finally, one of the research tasks was to examine the views of university teachers regarding the benefits and limitations of online teaching, and the aim of the study was to point out the importance of strengths, opportunities and potential ways to overcome weaknesses and threats to academic success during the Covid-19 pandemic. The advantages are certainly that the teachers have adapted to the novel conditions of teaching, that they have used online platforms, web tools, and shared materials with students. However, based on the expressed views, it is a common view that the traditional type of teaching is more efficient. The third hypothesis of the research was confirmed because there are statistically significant differences in the answers of the respondents about the advantages and disadvantages of online teaching with regard to gender, scientific field and scientific title.

The empirical research presented is just another attempt to shed light on this issue; however it focuses exclusively on the perspective of university teachers. In order to get a more complete picture, this issue should be examined from the perspective of teachers, students, parents, and it can also be put in the context of examining the entire educational system. This topic was chosen because there are very few studies that examine the quality of online teaching from the perspective of those who conduct it. For this reason, the noticeable differences with regard to the aforementioned sociodemographic characteristics may be an incentive for some other, futurological studies, but they may also represent a model by which this research can be compared to others.

These results contribute to our narrow academic community and there is no tendency to generalize data to the entire population of university teachers. In other studies, the weakness of online teaching in relation to its strengths is noticeable, as is the opinion that it cannot replace the traditional face-to-face teaching. As a convenient solution, a combination of traditional and online teaching in the form of a hybrid model is proposed, with one complementing the other. Through this method, the weaknesses of one teaching model could be compensated for by others, and the strengths could be maintained and increased.

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THE EFFECT OF FREQUENT TESTING ON STUDENT PERFORMANCE

Abstract: This study aims to evaluate the effect frequent testing has on students following computer programming courses in an online environment. The experiment consisted of 26 students divided into two groups: 12 students who took tests after each lesson during the module introducing them to computer programming and 14 students who only took the final exam. The first group of students took 14 tests over the course of ten weeks. All 26 students took the final test at the end of the module. The test presented after each lesson to the first group of students consisted of 10 multiple choice questions related to the material covered in the class. The final exam consisted of 30 multiple choice questions, 10 completely new questions, 10 of the least correctly answered and 10 of the most correctly answered questions during the frequent testing phase. Students received immediate feedback on the test score and could see the correct answer to each question after submitting the quiz. The results show that students who took tests after each class