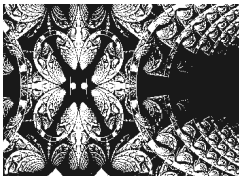

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# STUDENTS' PERCEPTION OF ONLINE TEACHING AND FACE TO FACE TEACHING

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After more than a year of online education in Croatia, which was caused by COVID-19, it is necessary to determine the effectiveness of online teaching. Therefore, the goal of the study was to determine the difference of the students' perception of quality between online and face-to-face teaching. The empirical study reveals which form of teaching is perceived to be of higher quality when taken as a whole by students, and what their perception is regarding the individual segments (lectures, seminars, mid-term exams, exercises, written/oral exams) of both types of teaching. The research was carried out with a questionnaire ($N$ = 172). To process the results of the research, statistical methods of descriptive statistics, the Kolmogorov-Smirnov test, Pearson correlation coefficient, and the t-test were used. The findings show that there is a statistically significant difference between online and F2F teaching. For more generalised data, it is necessary to involve other higher education institutions. The research makes recommendations for improving the education process in online teaching during the COVID-19 crisis or other similar crises.

Keywords: online education, face to face teaching, quality of the teaching process, students, Covid-19

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## INTRODUCTION

The COVID-19 pandemic demanded urgent epidemiological measures such as disinfections, social distancing, and quarantine (Khachfe et al., 2020). Despite all the measures, the pandemic was still spreading in the world, which is why it was necessary to go from face-to-face teaching to online teaching because of the shutdown of schools and higher education institutions (Martinez, 2020).

Therefore, both lecturers and students found themselves in a situation where they were forced to accept the digital academic experience (Lederman, 2020). E-learning and online courses had previously been considered to be a part of informal education, but as it stands today, they may replace the formal education system altogether if this crisis persists or a similar one reoccurs (Mishra et al., 2020). As a result, academic communities had to switch to the so-called Emergency remote teaching (ERT) model for education to continue in some form (Hodges et al., 2020). This new term redefined distance learning, which up to that point was well developed and led by committed professionals (Means et al., 2014), which was not the case with Emergency remote teaching (Hodges et al., 2020). Its original purpose was as a temporary solution for responding to crises, since both teachers and students who had little to no experience with remote teaching and learning participated in its implementation (Jandrić et al., 2020). Due to the new terminology, and completely new situations which the education system had not experienced throughout its history, the academic community is desperately searching for studies related to this topic (Bozkurt & Sharma, 2020; Dietrich, 2020).

As a result of the health crisis, there have been many studies in this field of research (Gherhes et al., 2021; Coman et al., 2020; Ionescu et al., 2020; Obrad, 2020; Edelhauser & Lupu-Dima, 2020) within which the term online teaching is mostly used, while the term "Emergency remote teaching" is used less. When researching the available literature, it was observed that these variables had been utilised most often: the differences between online and face-to-face teaching (hereinafter F2F), (Soffer & Nachmias, 2018; Nycz & Cohen 2007), the advantages and disadvantages of both types (Lassoued et al., 2020; Peters et al., 2020; Sadeghi, 2019), the attitudes of students and their sense of belonging (Cacheiro-Gonzalez et al., 2019), satisfaction (Tratnik et al., 2019), etc. The study by Petchamé et al. (2021) had the goal of determining student preferences for three teaching types: Emergency remote teaching, F2F and Smart classroom (SC). They determined that Emergency remote teaching and SC were considered to be more effective teaching types than F2F during the pandemic. One of the more interesting solutions was developed by Tagoe

(2012), who in his paper did not prioritise any of the teaching types. It was determined that students preferred a hybrid model, where online and F2F teaching were combined. The Soffer & Nachmias (2018) study compared the effectiveness of 3 online courses with 3 identical F2F courses, taking into account a wide spectrum of variables such as: course structure, course content, lessons, tasks, communication, involvement, and satisfaction. Their results have indicated that when observing effectiveness, online courses are just as or even more effective than F2F courses.

Since previous studies were determining predictors which contribute to the quality of teaching, this opens up the question regarding how students perceive the quality of the education process of the two teaching types, in other words, whether there is a difference in that perception, as studied by Soffer & Nachmias (2018) and Petchamé et al. (2021). However, those studies did not include all variables of the education process, i.e., its individual segments: lectures, seminars, exercises, mid-term exams, written/oral exams (hereinafter "individual segments"). When it comes to the perceived quality, which is the main research subject, only a couple of scientific papers included the variable quality of teaching (Nycz & Cohen, 2007). The shortcoming of these models is that students are not offered the possibility of evaluating on a scale the perceived quality of the two teaching types by their individual segments. In addition, in previous papers it is questionable whether the research and online teaching was done concurrently. The advantage of this study is that students filled the questionnaire immediately after the Emergency remote teaching was finished, during the pandemic, and while the experience of this form of teaching was still fresh in their minds.

Moreover, it can be concluded that the studies mentioned in the Introduction and Literature overview have identified a great deal of factors which influence the quality of teaching, but there is a research gap, especially in the area of perceived quality of the two types of teaching, as previously mentioned. Therefore, it is necessary to redesign the existing models, and ask the students how they perceive the quality of Emergency remote teaching and F2F teaching by their individual segments, so that we can have a complete picture of the perceived quality of the education process.

This study aims to complete the research gap, and the expected scientific contribution entails identifying the crucial parts of the education process (lectures, seminars, mid-term exams, and written/oral exams) which students perceive to be of a higher quality when comparing F2F and online teaching, all with the goal of improving teaching in accordance with technology trends and the perception of students.

## RESEARCH OVERVIEW

Previous research on this topic has shown that the satisfaction of students is mainly influenced by the interaction between teachers and students (Fedynich et al., 2015). The critics of online teaching have questioned the quality of this type of education, since they consider that it will never replace face-to-face interaction (Aguilera-Hermida, 2020) and that its quality is lower when compared to traditional teaching. They refer to shortcomings such as: a high degree of frustration, low level of interest and satisfaction, technical and logistical problems, a lack of interaction with the mentor and feedback, a lot of emails and online discussions (Lassoued et al., 2020; Peters et al., 2020), and the need for self-discipline (Edmundson, 2009). Even with these shortcomings, it is without question that online education is becoming more relevant, especially considering the intensity of technological progress (Dukić & Mađarić, 2012).

Online teaching does have advantages, such as: availability to students, the didactic value of online tools in teaching, the development of digital skills (Nikolić & Milojević, 2020), the temporal and spatial dimension, cost-effectiveness, flexibility (Sadiku et al., 2018), better availability of class materials, and a more individualised education process (Dukić & Mađarić, 2012).

Since many advantages and disadvantages of both teaching types have already been established in the literature overview, and in the Introduction a research gap has been highlighted, there is the notion that focus needs to be placed on the students' perceived quality, which should be compared for both teaching types. But previous studies involving students' perception were mainly concerned with the predictive satisfaction variables, the perception of learning (Baber, 2020; Ikhsan, et al., 2019; Marks et al., 2005; Richardson & Swan, 2003), perceived quality (Abrahamsson & Dávila López, 2021), and effectiveness (Butnaru et al., 2021; Thoms, 2020, 2014). In this context, Gray and DiLoreto (2016) have determined that student perception and satisfaction can help in understanding whether teaching was successful. Richardson and Swan (2003) have indicated that there is a significant correlation in online teaching between the general perception of learning and the satisfaction of students. In addition, it has been determined that the students' perception of learning is a good predictor of student satisfaction (Ikhsan et al., 2019; Marks et al., 2005). The above has also been confirmed in a newer study which determined that the perception of learning has a positive effect on student satisfaction in online teaching during the pandemic (Baber, 2020). A study from Abrahamsson &

Dávila López (2021) also utilised the perceived quality variable, in this case for the entirety of the course structure, for which it was determined that students perceive the quality of online and F2F courses as being the same. A meta-analysis of previous studies was synthesised by Thoms (2020, 2014), who reported that he, in general, considers hybrid teaching courses to be as effective as F2F courses, if not even more effective for certain language skills such as writing.

According to the research overview which included the variable also used in this study, i.e., the perceived quality variable, it can be concluded that this study differentiates itself by measuring perceived quality through individual segments of the education process including lectures, seminars, exercises, mid-term exams, and written/oral exams. These were formed according to the curriculum of the researched higher education institution, and for that reason have been taken as variables. Such measuring should determine if there are differences in the perceived quality of the individual segments, in order to discover which segments could be done online without negatively affecting the students' perception of quality.

## ONLINE EDUCATION IN THE RESEARCHED HIGHER EDUCATION INSTITUTION

During the pandemic, in Croatia all classes were online due to the declared state of emergency, despite only a small number of universities having certificates for online teaching (The Ministry of Science and Education, 2020). At the higher education institution from which came the respondents, Emergency remote teaching began in March 2020, and lasted until September 2020, after which the university switched to a hybrid model, where lectures and seminars were online, while laboratory, auditory exercises, mid-term exams, written/oral exams were done F2F. From the available platforms, Loomen was used for sharing materials for class, while Zoom and Microsoft Teams were used for establishing a direct link between the teacher and the student.

To overcome problems and use all the advantages of online teaching, it is necessary to find a balance between online and offline teaching, which is made possible by the hybrid model (Mishra et al., 2020), which the Virovitica University of Applied Sciences also decided to use later in the year. This situation could be seen as a kind of pilot project for online education in the researched institution. To determine how successful this type of teaching is, it is necessary to examine how students perceive the quality of online teaching. Perceived satisfaction could be defined as a state of pleasure or disappointment compared to an expected value (Chen et al., 2020), or in

other words, a thought process which emerges from the consequence of a certain experience which includes personal success/failure in learning and achieving learning goals.

## METHODOLOGICAL FRAMEWORK OF THE EMPIRICAL RESEARCH

The primary data for this study was obtained through a survey, while the secondary research involved an analysis and synthesis of previous studies. The main goal of the paper was to analyse students' perceptions of the quality of teaching, particularly in individual segments of the teaching process. To achieve this goal, the study aimed to answer the following research questions: How do students perceive online teaching compared to face-to-face (F2F) teaching, and do they perceive individual segments to be of higher quality online or F2F?

In accordance with the subject of the research and the research questions, the following hypotheses and auxiliary hypothesis were formulated:

H1: *Students perceive the quality of the entire education process to be more effective F2F than online.*

AH1: *There is a positive connection between lectures and exercises within F2F teaching and the perception of the overall quality of F2F teaching.*

H2: *Students perceive the quality of all individual segments of the F2F teaching process as more effective compared to online teaching.*

The primary survey was conducted in February 2021 among students of the Virovitica University of Applied Sciences. The sample size was 172 students out of 375 students enrolled in the academic year 2020/2021, which corresponds to 45.87% with a confidence level of 95%, and a margin of error of 5.51%. The measuring instrument was a questionnaire which was distributed over the Internet, while the ethical aspect of the research was also taken into account, with the respondents being anonymous. While conducting the study, the authors followed all legal guidelines, as well as the ethical codex, which define the obligations and responsibilities of researchers. The first part of the survey gave information on the purpose of the research, and the first set of questions were related to the socio-demographic characteristics of the respondents. The second and third set of questions used a Likert scale with a 7-level intensity so that a neutral value could be avoided, which respondents are known to use frequently. The Likert agreement scale measured the perception of quality of online teaching and F2F teaching, while the last set of questions examined which parts of the education process students would select if they were offered to be online.

Descriptive statistical analysis, Kolmogorov-Smirnov test, the correlation analysis and the t-test were used in the primary data analysis to determine the direction and the strength of the correlation between variables and to determine the differences between education models. Kolmogorov-Smirnov test examined the normality of the distribution, while the descriptive analysis was done to determine the number of respondents, the arithmetic mean, and the standard deviation of the respondents' responses in the Likert agreement scale.

The t-test was used to prove H1, i.e., the perceived quality of the entire education process. The correlation analysis was used, specifically Person's correlation coefficient, to analyse AH1, whereby the goal was to determine which segments of the education process were the most significant for the perception of quality of F2F teaching. The goal was to determine the direction and strength of connection of individual segments and how they influenced the perception of F2F teaching. And finally, to examine H2, the t-test was also used to determine the differences between individual segments of the education which are held online and F2F. All statistical methods were done in the Excel programme package.

### Testing the prerequisites for using parametric procedures

Before conducting statistical analysis with the Kolmogorov-Smirnov test, the normality of various variables was tested, including the overall quality of online and F2F teaching, as well as the quality of lectures, seminars, exercises, mid-term exams, written exams, and oral exams in both online and F2F model. This demonstrated that the distribution of the aforementioned variables deviates in a statistically significant way from the norm by a margin of 1% ($p < 0.01$). Regardless, by observing the skewness and kurtosis index, it can be noticed that the absolute value of the skewness index is in an interval from 0.344 to 1.111, and the kurtosis index is in an interval from 0.095 to 1.216. As Kline (2016) states, distribution can be considered normal if the skewness index is less than three, and if the kurtosis index is less than ten. Since both the skewness and kurtosis indexes are less than these values, it was decided that applying the parametric procedures on this data was justified.

## RESULTS OF THE RESEARCH

The first part of the presented results shows the descriptive data of the test variables, the segments of the education process in which students would enrol if they were offered to be online, and the average grade of the individual types of teaching by study programme. The second part of the paper presents the comparison of the entire education process, while

the third part presents the results of the comparison of individual segments of the F2F education process in relation to online teaching.

➲ TABLE 1
Descriptive data of the test variables

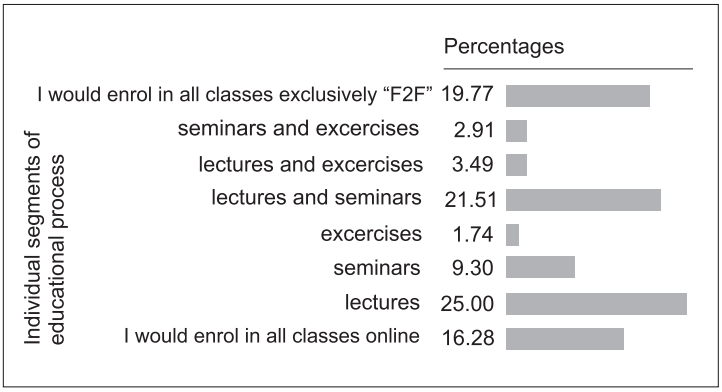
| | *N* | *M* | *SD* | $P_{min}$ | $P_{max}$ |
|---|---|---|---|---|---|
| The overall quality of online teaching | 172 | 4.99 | 1.528 | 1 | 7 |
| The overall quality of F2F teaching | 172 | 5.62 | 1.344 | 1 | 7 |
| The quality of lectures online | 172 | 5.13 | 1.467 | 1 | 7 |
| The quality of lectures F2F | 172 | 5.71 | 1.319 | 1 | 7 |
| The quality of seminars online | 166 | 5.28 | 1.605 | 1 | 7 |
| The quality of seminars F2F | 166 | 5.47 | 1.520 | 1 | 7 |
| The quality of exercises online | 172 | 4.49 | 1.749 | 1 | 7 |
| The quality of exercises F2F | 172 | 5.74 | 1.421 | 1 | 7 |
| The quality of mid-term exams online | 151 | 4.54 | 2.078 | 1 | 7 |
| The quality of mid-term exams F2F | 151 | 5.74 | 1.561 | 1 | 7 |
| The quality of written exams online | 149 | 4.60 | 2.030 | 1 | 7 |
| The quality of written exams F2F | 149 | 5.87 | 1.408 | 1 | 7 |
| The quality of oral exams online | 161 | 5.56 | 1.627 | 1 | 7 |
| The quality of oral exams F2F | 161 | 5.55 | 1.600 | 1 | 7 |

Note: *N* – number of participants; *M* – arithmetic mean; *SD* – standard deviation; $P_{min}$ – achieved minimum; $P_{max}$ – achieved maximum

The obtained results have shown that participants evaluate the overall quality of online teaching, the quality of exercises online, the quality of mid-term exams online, and the quality of written exams online with average grades, with a tendency towards higher grades, while other components were evaluated on average to be of a very high quality. Generally, participants evaluated online exercises with the lowest degree of quality, while written exams were evaluated as being of the highest quality.

When participants were asked directly which parts of the education process they would choose if they were offered to be online, they answered:

➲ FIGURE 1
Parts of the education process students would choose if they were offered to be online



The answers of the respondents show that 19.77% of students only want F2F teaching, whereas 16.28% want all teaching to be online. For partial segments of teaching, in the greatest number of cases, students consider lectures (25%) and lectures and seminars (21.51%) to be acceptable online.

If we observe the average grade by study programme, dividing the students into ones who study social sciences in relation to students of technical sciences and analyse the average grade for the overall quality of teaching, the results are:

➲ TABLE 2
The average grade of individual segments of teaching by study programme

| Scientific field | Study programme | Online teaching *M* | F2F teaching *M* |
|---|---|---|---|
| Technical sciences | Telecommunications and informatics | 4.00 | 5.20 |
| | Software Engineering | 4.63 | 4.75 |
| Social sciences | Management of rural tourism | 5.00 | 5.93 |
| | Informatics management | 4.93 | 5.93 |
| | Entrepreneurship | 5.19 | 5.68 |
| | Small and medium enterprises | 5.07 | 5.44 |
| | Destination management | 4.88 | 5.33 |

Note: *M* – arithmetic mean

Analysing the average grade of individual study programmes and the grade for online and F2F teaching, it can be observed that students prefer F2F because it received a higher average grade.

The Pearson correlation coefficient is 0.55, which shows a real and significant correlation between these two variables, no matter if we are observing social or technical sciences. This directly proves that all students, regardless of their study programme or scientific field, perceive, in a statistically significant way, that F2F teaching is of higher quality and better in general than online teaching. All students experience the perceived quality in a similar way irrespective of their field or level of technological familiarity.

With the correlation matrix of the entire F2F education process and individual segments of it, the intent was to determine to what extent and which individual segments of the education process have a more significant influence on the perception that F2F teaching is of higher quality when compared to online teaching.

Based on the Pearson correlation coefficients, it can be concluded that F2F lectures are an irreplaceable part of the education process, and all students consider that this part should not ever be online, or in other words, in some potential "hybrid" model this segment should never be online and should most definitely be F2F. On the other hand, seminars influ-

enced least the perception of students as a form of teaching that must be F2F, and according to respondents' answers this part could be held online and in a potential hybrid model would be of the same quality if the entire teaching were F2F. A deeper analysis of the perception of quality of individual segments will be shown below, so insight can be gained into the actual perception of quality, which could be different than the desire to actually enrol in certain segments of online teaching.

TABLE 3
The correlation matrix of influences of individual segments of the education process on F2F teaching overall

| Individual segments of the education process | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 F2F teaching overall | 1 | | | | | | |
| 2 Lectures F2F | 0.857 | 1 | | | | | |
| 3 Seminars F2F | 0.610 | 0.639 | 1 | | | | |
| 4 Exercises F2F | 0.792 | 0.758 | 0.639 | 1 | | | |
| 5 Mid-term exams F2F | 0.734 | 0.659 | 0.416 | 0.669 | 1 | | |
| 6 Written exams F2F | 0.749 | 0.668 | 0.434 | 0.690 | 0.968 | 1 | |
| 7 Oral exams F2F | 0.707 | 0.670 | 0.568 | 0.581 | 0.667 | 0.651 | 1 |

## The differences in the evaluation of the overall quality of F2F and online teaching

To examine the differences in overall quality between online and F2F teaching, the t-test was used for dependent samples where one variable was the quality of online teaching, and the second the quality of F2F teaching.

TABLE 4
The results of the t-test for dependent samples for comparing overall online and F2F teaching

| Variables | *M* | *SD* | *t* (171) |
|---|---|---|---|
| The overall quality of online teaching | 4.99 | 1.528 | -4.564** |
| The overall quality of F2F teaching | 5.62 | 1.344 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test; $^{**}p < 0.01$

The results have shown that there is a statistically significant difference in the perception of the quality of online teaching and the quality of F2F teaching, which can be seen in the t-test ($t$ (171) = -4.564, $p < 0.01$) that proved to be significant. Namely, participants perceive F2F teaching to be substantially of higher quality than online teaching.

## The differences in the evaluation of the quality of online and F2F lectures

To examine the differences in quality between online and F2F lectures, the t-test was used for dependent samples where one variable was the quality of online lectures, and the second the quality of F2F lectures.

➲ TABLE 5
The results of the t-test for dependent samples for comparing the quality of online and F2F lectures

| Variables | *M* | *SD* | *t* (171) |
|---|---|---|---|
| The quality of lectures online | 5.13 | 1.467 | -4.406** |
| The quality of lectures F2F | 5.71 | 1.319 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test; $^{**}p < 0.01$

The results have shown that there is a statistically significant difference in the perception of the quality of online lectures and the quality of F2F lectures, which can be seen in the t-test ($t$ (171) = -4.406, $p < 0.01$) that proved to be significant. Namely, participants perceive F2F lectures to be substantially of higher quality than online lectures.

## The differences in the evaluation of the quality of online and F2F seminars

To examine the differences in quality between online and F2F seminars, the t-test was used for dependent samples where one variable was the quality of online seminars, and the second the quality of F2F seminars.

➲ TABLE 6
The results of the t-test for dependent samples for comparing the quality of online and F2F seminars

| Variables | *M* | *SD* | *t* (165) |
|---|---|---|---|
| The quality of seminars online | 5.28 | 1.605 | -1.181 |
| The quality of seminars F2F | 5.47 | 1.520 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test

The results have shown that there is not a statistically significant difference in the perception of quality of online seminars and the quality of F2F seminars, which can be seen in the t-test ($t$ (165) = -1.181, $p > 0.05$) that did not prove to be significant. Namely, participants consider both online and F2F seminars to be of equal quality.

## The differences in the evaluation of the quality of online and F2F exercises

To examine the differences in quality between online and F2F exercises, the t-test was used for dependent samples where one variable was the quality of online exercises, and the second the quality of F2F exercises.

The results have shown that there is a statistically significant difference in the perception of quality of online exercises and the quality of F2F exercises, which can be seen in the t-test ($t$ (171) = -7.343, $p < 0.01$) that proved to be significant. Namely, participants perceive F2F exercises to be substantially of higher quality than online exercises.

➲ TABLE 7
The results of the t-test for dependent samples for comparing the quality of online and F2F exercises

| Variables | *M* | *SD* | *t* (171) |
|---|---|---|---|
| The quality of exercises online | 4.49 | 1.749 | -7.343** |
| The quality of exercises F2F | 5.74 | 1.421 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test
**$p < 0.01$

## The differences in the evaluation of the quality of online and F2F mid-term exams

To examine the differences in quality between online and F2F mid-term exams, the t-test was used for dependent samples where one variable was the quality of online mid-term exams, and the second the quality of F2F mid-term exams.

➲ TABLE 8
The results of the t-test for dependent samples for comparing the quality of online and F2F mid-term exams

| Variables | *M* | *SD* | *t* (150) |
|---|---|---|---|
| The quality of mid-term exams online | 4.54 | 2.078 | -6.095** |
| The quality of mid-term exams F2F | 5.74 | 1.561 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test
**$p < 0.01$

The results have shown that there is a statistically significant difference in the perception of the quality of online mid--term exams and the quality of F2F mid-term exams, which can be seen in the t-test ($t$ (150) = -6.095, $p < 0.01$) that proved to be significant. Namely, participants perceive F2F mid-term exams to be substantially of higher quality than online mid--term exams.

## The differences in the evaluation of the quality of written exams

To examine the differences in quality between online written exams and F2F written exams, the t-test was used for dependent samples where one variable was the quality of online written exams, and the second the quality of F2F written exams.

➲ TABLE 9
The results of the t-test for dependent samples for comparing the quality of online written exams and F2F written exams

| Variables | *M* | *SD* | *t* (148) |
|---|---|---|---|
| The quality of written exams online | 4.60 | 2.030 | -6.328** |
| The quality of written exams F2F | 5.87 | 1.408 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test
**$p < 0.01$

The results have shown that there is a statistically significant difference in the perception of the quality of online written exams and the quality of F2F written exams, which can be seen in the t-test ($t$ (148) = -6.328, $p < 0.01$) that proved to be significant. Namely, participants perceive F2F written exams to be substantially of higher quality than online written exams.

## The differences in the evaluation of the quality of online and F2F oral exams

To examine the differences in quality between online and F2F oral exams, the t-test was used for dependent samples where one variable was the quality of online oral exams, and the second the quality of F2F oral exams.

➲ TABLE 10
The results of the t-test for dependent samples for comparing the quality of online oral exams and F2F oral exams

| Variables | *M* | *SD* | *t* (160) |
|---|---|---|---|
| The quality of oral exams online | 5.56 | 1.627 | 0.037 |
| The quality of oral exams F2F | 5.55 | 1.600 | |

*Note*: *M* – arithmetic mean; *SD* – standard deviation; *t* – t-test
$^{**}p < 0.01$

The results have shown that there is not a statistically significant difference in the perception of the quality of online oral exams and the quality of F2F oral exams, which can be seen in the t-test ($t$ (160) = -0.037, $p > 0.05$) that did not prove to be significant. Namely, participants consider both online and F2F oral exams to be of equal quality.

## DISCUSSION

The carried-out survey examined how accepted online teaching actually is, and its perceived quality. Based on the obtained data from the primary survey, the following hypotheses were selected:

H1: *Students perceive the* overall *quality of* F2F *teaching to be more effective than online teaching.*

The hypothesis is accepted fully. It can be surmised from the data analysis that respondents undoubtedly perceive F2F teaching to be of higher quality, and if they were given the option of choosing either online or F2F classes, they would rather choose F2F classes. The above is confirmed by a study which indicated that "motivation decreased when students transitioned to online learning, and interaction was a motivating factor for students. Also, students reported that the lack of interaction with professors and students was a challenge for them" (Aguilera-Hermida, 2020).

AH1: *There is a positive connection between lectures and exercises within F2F teaching and the perception of the overall quality of F2F teaching*.

The auxiliary hypothesis is accepted fully, since data analysis has determined that respondents consider individual segments of the education process to be of higher quality when held only F2F, and those segments they would never choose in their online form. This primarily applies to lectures and exercises for which it is necessary for students to have special devices or equipment which they might not have had in their homes, or in other words, outside the university. For individual parts of the process, such as seminars, respondents consider them to be acceptable online and that they need not be held in front of the professor and other colleagues. The above has also been confirmed by a previous study by Tagoe (2012), where respondents have showed a preference for the hybrid model of teaching as the most effective type. Certain segments were considered to be of higher quality when done F2F, while others were considered to be more effective online. This is substantiated by a meta-analysis where it was established that hybrid courses are as equally effective as F2F courses, if not even more effective, meaning that it is a good idea to combine online and F2F (Thoms, 2020, 2014).

H2: *Students perceive the quality of all individual segments of the F2F teaching process as more effective compared to online teaching*.

The hypothesis is not accepted, despite students considering that in most cases, if they were given two alternatives between F2F and online classes, they would choose the F2F model. Individual segments are still perceived to be of equal quality both in the F2F and online model. The survey reveals that students consider the entire F2F education process to be of higher quality than online teaching, while individual elements (seminars and oral exams) are perceived to be of nearly equal quality when held online, in contrast to written exams, exercises and mid-term exams, and lectures, which are perceived to be of higher quality when held F2F.

The above hypothesis could be compared to the results of previous studies by Petchamé et al. (2021), who have determined that respondents considered Emergency remote teaching and SC to be more effective than F2F teaching during the pandemic. In addition, Abrahamsson & Dávila López have determined that the level of effectiveness of online and F2F courses was the same (Abrahamsson & Dávila López, 2021), or is even in favour of the online version (Soffer & Nachmias,

2018). Considering that the results were unclear in this and other studies, the hypothesis cannot be accepted.

The social factor and personal face-to-face interaction continue to be a crucial part of teaching, but the results have shown that online teaching is becoming an acceptable alternative to F2F teaching and has also increased their knowledge of online educational technologies. This is also indicated by Murphy (2020, according to Aguilera-Hermida, 2020): "The use of emergency eLearning programs increased the students' knowledge of technological tools. The knowledge and experience gained may help students with their future abilities and perception of self-efficacy regarding online educational technologies".

The scientific contribution of this research mainly involves identifying which elements of the F2F education process (lectures, seminars, mid-term exams, written/oral exams) students perceive to be of higher quality when compared to online teaching, all with the goal of improving teaching in accordance with technological trends and student perception. This study shows that students prefer personal contact in classes, but from the research results it can be concluded that even in "normal conditions" they would be ready to accept certain segments to be fully online, which indicates that there is a need for the modification of the education system. This research has observed that the perceived quality of teaching would not decrease if individual segments of the education process were to be held online (seminars and oral exams). It is because of this reason that the hybrid model of teaching in the COVID-19 crisis should be on the same level of perceived quality among students as in F2F teaching (Tagoe, 2012). The hybrid model would ensure a more efficient transfer of knowledge which would involve the traditional form of teaching combined with online elements of certain segments of the education process. This is why it would be effective to use this model for any other future COVID-19 crises or other states of emergency. Online teaching still needs to become more developed and refined in the future if an open system of higher and lifelong education is to be created, which will become necessary, and which might involve education retypes. The limitations of this survey mainly pertain to the participants coming only from the Virovitica University of Applied Sciences, which means if the data is to be applied to the entire country, a more robust survey must be carried out which will have to involve other higher education institutions. Moreover, it would be useful to compare this and other similar surveys with the ones from the rest of Europe, or even from the entire world.

## CONCLUSION

The explosive growth of new technologies offers new possibilities for online education, which higher education institutions need to respond to.

It can be established that online education is necessary for the Republic of Croatia's universities to improve the quality of the education process by following technological trends. Due to the ever-increasing need for higher education, an exclusively traditional way of education can no longer satisfy the needs of all students. Sudden global changes had forced educational institutions to adapt to new trends before they considered it was going to be necessary. The analysis of this form of teaching has shown that online teaching can be just as effective as F2F teaching when it comes to seminars and oral exams, but on the other hand, for now, written exams, mid-term exams, exercises, and lectures are still preferred in the classroom. Students perceived F2F teaching as of higher quality, but thought nevertheless that it would not be a problem if certain segments were held online.

Considering that the analysis put emphasis on the good work experience of the researched higher education institutions, online teaching, although with some deficiencies, needs to be developed and refined if an open system for higher and lifelong education is to be created. It will become necessary, and it will involve education retypes.

## REFERENCES


Abrahamsson, S., & Dávila López, M. (2021). Comparison of online learning designs during the COVID-19 pandemic within bioinformatics courses in higher education. *Bioinformatics, 37,* 9–15. https://doi.org/10.1093/bioinformatics/btab304

Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open, 1,* 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID-19. *Journal of Education and e-learning Research, 7*(3), 285–292. https://doi.org/10.20448/journal.509.2020.73.285.292

Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to the coronavirus pandemic. *Asian Journal of Distance Education, 15*, i-vi.

Butnaru, G. I., Niță, V., Anichiti, A., & Brînză, G. (2021). The effectiveness of online education during the COVID-19 pandemic – A comparative analysis between the perceptions of academic students and high school students from Romania. *Sustainability, 13*(9), 5311. https://doi.org/10.3390/su13095311

Cacheiro-Gonzalez, M. L., Medina-Rivilla, A., Dominguez-Garrido, M. C., & Medina-Dominguez, M. (2019). The learning platform in

distance higher education: Students' perceptions. *Turkish Online Journal of Distance Education, 20*(1), 71–95. https://doi.org/10.17718/tojde.522387

Chen, T., Peng, L., Yin, X., Rong, J., Yang, J., & Cong, G. (2020). Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. *Healthcare, 8*(3), 200. https://doi.org/10.3390/healthcare8030200

Coman, C., Țîru, L. G., Meseşan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability, 12*(24), 10367. https://doi.org/10.3390/su122410367

Dietrich, A. J. (2020). Charting a path forward for education abroad research. *Frontiers, 32*(2), 1–11. https://doi.org/10.36366/frontiers.v32i2.465

Dukić, D., & Mađarić, S. (2012). Online učenje u hrvatskom visokom obrazovanju (Online learning in Croatian tertiary education). *Tehnički glasnik, 6*(1), 69–72.

Edelhauser, E., & Lupu-Dima, L. (2020). Is Romania prepared for eLearning during the COVID-19 pandemic? *Sustainability, 12*(13), 5438. https://doi.org/10.3390/su12135438

Edmundson, A. L. (2009). Culturally accessible e-learning: An overdue global business imperative. *Training & Development, 63*(4), 40–45.

Fedynich, L. V., Bradley, K. S., & Bradley, J. (2015). Graduate students' perceptions of online learning. *Research in Higher Education Journal,* 27, 1–13.

Gherhes, V., Simon, S., & Para, I. (2021). Analysing students' reasons for keeping their webcams on or off during online classes. *Sustainability, 13*(6), 3203. https://doi.org/10.3390/su13063203

Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation, 11*(1).

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*.

Ikhsan, R. B., Saraswati, L. A., Muchardie, B. G., & Susilo, A. (2019). *The determinants of students' perceived learning outcomes and satisfaction in BINUS online learning*. 5th International Conference on New Media Studies (9–11 Oct. 2019). https://doi.org/10.1109/CONMEDIA46929.2019.8981813

Ionescu, C. A., Paschia, L., Gudanescu Nicolau, N. L., Stanescu, S. G., Neacsu Stancescu, V. M., Coman, M. D., & Uzlau, M. C. (2020). Sustainability analysis of the e-Learning education system during the pandemic period – COVID-19 in Romania. *Sustainability, 12*(21), 9030. https://doi.org/10.3390/su12219030

Jandrić, P., Hayes, D., Truelove, I., Levinson, P., Mayo, P., Ryberg, T., Monzó, L. D., Allen, Q., Stewart, P. A., Carr, P. R., Jackson, L., Bridges, S., Escaño, C., Grauslund, D., Mañero, J., Lukoko, H. O., Bryant, P., Fuentes-Martinez, A., Gibbons, A.,… Arndt, S. (2020). *Teaching in the age of COVID-19. Postdigital Science and Education, 2,* 1069–1230. https://doi.org/10.1007/s42438-020-00169-6

Khachfe, H. H., Chahrour, M., Sammouri, J., Salhab, H., Makki, B. E., & Fares, M. (2020). An epidemiological study on COVID-19: A rapidly spreading disease. *Cureus, 12*(3), e7313. doi:10.7759/cureus.7313 https://doi.org/10.7759/cureus.7313

Kline, R. B. (2016). *Principles and practice of structural equation modeling,* 4th ed. The Guilford Press.

Lassoued, Z., Alhendawi, M., & Bashitialshaaer, R. (2020). An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic. *Education Sciences, 10*(9), 232. https://doi.org/10.3390/educsci10090232

Lederman, D. (2020, March 18). Will shift to remote teaching be boon or bane for inline learning? *Inside Higher Ed*. https://www.insidehighered.com/digital-learning/article/2020/03/18/most-teaching-going-remote-will-help-or-hurt-online-learning

Marks, R. B., Sibley, S. D., & Arbaugh, J. B. (2005). A structural equation model of predictors for effective online learning. *Journal of Management Education, 29*(4), 531–563. https://doi.org/10.1177/1052562904271199

Martinez, J. (2020, June 22). *Take this pandemic moment to improve education.* EduSource.

Means, B., Bakia, M., & Murphy, R. (2014). *Learning online: What research tells us about whether, when and how*. Routledge. https://doi.org/10.4324/9780203095959

Ministarstvo znanosti i obrazovanja (Ministry of Science and Education) (2020, March 13). *Dodatne upute vezano uz obustavu nastave na visokim učilištima* (*Additional instructions regarding the suspension of classes at universities*). Ministarstvo znanosti i obrazovanja. https://mzo.gov.hr/vijesti/akademska-godina-2019-2020-visoko-obrazovanje/ 3941

Mishra, L., Gupta, T., & Abha, S. (2020). Online teaching-learning in higher education during the lockdown period of the COVID-19 pandemic. *International Journal of Educational Research Open, 1*, 100012. https://doi.org/10.1016/j.ijedro.2020.100012

Murphy, M. P. A. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy, 41*(3), 492–505. https://doi.org/10.1080/13523260.2020.1761749

Nikolić, N., & Milojević, Z. (2020). *Trenutno stanje u onlajn nastavi u Srbiji i regionu – Izveštaj* (*Current situation in online teaching in Serbia and the region – Report*). Obrazovno kreativni centar, Bor. https://okc.rs/wp-content/uploads/2020/06/Istra%C5%BEivanje-Stanje-u-onlajn-nastavi-u-Srbiji.pdf

Nycz, M., & Cohen, E. B. (2007). The basics for understanding e-learning. In N. A. Buzzetto-More (Ed.), *In principles of effective online teaching* (pp. 1–17). Informing science press, Santa Rosa, CA, USA.

Obrad, C. (2020). Constraints and consequences of online teaching. *Sustainability, 12*(17), 6982. https://doi.org/10.3390/su12176982

Petchamé, J., Iriondo, I., Villegas, E., Riu, D., & Fonseca, D. (2021). Comparing face-to-face, emergency remote teaching and smart classroom: A qualitative exploratory research based on students' experience during the COVID-19 pandemic. *Sustainability, 13*(12), 6625. https://doi.org/10.3390/su13126625

Peters, M. A., Wang, H., Ogunniran, M. O., Huang, Y., Green, B., Chunga, J. O., Quainoo, E. A., Ren, Z., Hollings, S., Mou, C., Khomera, S. W., Zhang, M., Zhou, S., Laimeche, A., Zheng, W., Xu, R., Jackson, L., & Hayes, S. (2020). China's internationalized higher education during COVID-19: Collective student autoethnography. *Postdigital Science and Education, 2*(3), 968–988. https://doi.org/10.1007/s42438-020-00128-1

Richardson, J., & Swan, K. (2003). Examing social presence in online courses in relation to students' perceived learning and satisfaction. *JALN, 7*(1), 68–88. https://doi.org/10.24059/olj.v7i1.1864

Sadeghi, M. A. (2019). Shift from classroom to distance learning: Advantages and limitations. *International Journal of Research in English Education, 4*(1), 80–88. https://doi.org/10.29252/ijree.4.1.80

Sadiku, M. N. O., Adebo, P. O., & Musa, S. M. (2018). Online teaching and learning. *International Journals of Advanced Research in Computer Science and Software Engineering, 8*(2), 73–75. https://doi.org/10.23956/ijarcsse.v8i2.549

Soffer, T., & Nachmias, R. (2018). Effectiveness of learning in online academic courses compared with face-to-face courses in higher education. *Journal of Computer Assisted Learning, 34*(5), 534–543. https://doi.org/10.1111/jcal.12258

Tagoe, M. (2012). Students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana. *International Journal of Education and Development Using Information and Communication Technology, 8*(1), 91–103.

Thoms, J. J. (2014). Analyzing linguistics outcomes of second language learners: Hybrid versus traditional course contexts. In F. Rubio & J. J. Thoms (Eds.), *Hybrid language learning and teaching: Exploring theoretical, pedagogical and curricular issues* (pp. 177–195). Cengage/Heinle.

Thoms, J. J. (2020). Re-envisioning L2 hybrid and online courses as digital open learning and teaching environments: Responding to a changing world. *Second Language Research & Practice, 1,* 86–98

Tratnik, A., Urh, M., & Jereb, E. (2019). Student satisfaction with an online and a face-to-face Business English course in a higher education context. *Innovations in Education and Teaching International, 56*(1), 36–45. https://doi.org/10.1080/14703297.2017.1374875

# Studentska percepcija nastave na daljinu i nastave licem u lice

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Nakon više od godinu dana obrazovanja na daljinu u Republici Hrvatskoj, koje je uzrokovano COVID-19 pandemijom, nužno je ustanoviti učinkovitost ovoga tipa nastave te je usporediti s učinkovitosti nastave licem u lice. Stoga je cilj istraživanja bio utvrditi razliku između studentske

percipirane kvalitete nastave na daljinu i nastave licem u lice. Empirijsko istraživanje otkriva koji oblik nastave studenti u cijelosti percipiraju kao kvalitetniji oblik i kakva je njihova percepcija po pojedinim segmentima (predavanja, seminari, kolokviji, usmeni/pismeni ispiti) tih dvaju oblika. Empirijsko istraživanje ima cilj istražiti percipiraju li studenti nastavu na daljinu kvalitetnijom u odnosu na nastavu licem u lice i koje elemente nastavnoga procesa percipiraju kvalitetnijima. Istraživanje je provedeno anketnim upitnikom na uzorku od 172 ispitanika. Za obradbu rezultata istraživanja uzete su statističke metode deskriptivne statistike, Kolmogorov-Smirnov test, Pearsonov koeficijent korelacije i t-test. Rezultati pokazuju da postoji statistički značajna razlika u percepciji kvalitete nastave. Za uopćavanje podataka na razini države ili na globalnoj razini treba obuhvatiti i druge visokoškolske institucije. Okolnosti uzrokovane pandemijom u posljednjih godinu dana pridonijele su novim oblicima obrazovanja koji se do sada nisu primjenjivali, stoga su donesene preporuke za unaprjeđenje nastavnoga procesa u nastavi na daljinu kojima se ona može unaprijediti tijekom COVID-19 krize ili drugih sličnih kriza.

Ključne riječi: nastava na daljinu, nastava licem u lice, kvaliteta nastavnoga procesa, studenti, COVID-19

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