

# Online learning during COVID-19 pandemic as perceived by the students of Graphic engineering and design

## ABSTRACT

*In this work we wanted to determine how students of Graphic engineering and design perceived online learning a year after the transition from traditional to online classes. The goal was to better understand problems, challenges, and good sides of online learning in this study field, and determine factors that impede knowledge transfer. The students' responses were collected via an anonymous online survey, which consisted of a series of questions that covered: conditions in which online classes are attended, communication channels, problems and how they are dealt with, understanding and motivation. The biggest challenges for our students were to sustain their attention and concentration during classes despite the distractors in their environments, and to keep their motivation despite the lack of direct interaction, social isolation, and too much computer time. Their technological and digital literacy were of great use in adapting to the online platforms and applications, as well as in solving technical problems that prevented them from following the classes. Even though online courses allow students to be more flexible and potentially combine work and study, most of our students do not think that their attendance and engagement in the studies increased in the last period. It is also undisputed that our students were dealing with a lot of stress and anxiety and that their emotional state highly influenced their perception of online learning. Hence, we firmly believe that apart from making online courses more engaging and interactive, it is of utmost importance to find a proper way to motivate and psychologically support students in the online learning environment, especially in times that require a high degree of resilience.*

## KEY WORDS

Covid-19, online learning, pandemic, online classes, engineering

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## Introduction

At the beginning of 2020 the whole world had to stop. The limitations created by the Covid-19 pandemic affected everyone, and the fast adaptation to the "new normality" becomes the top priority. It goes without saying that the educational institutions were among those that were affected the most. Both students and lecturers had to show a significant amount of flexibility in the new, virtual learning environment. Distance education is not a new concept, and numerous studies have already

focused on different ways of implementing it. Retaining the students in the online platforms was shown to be a challenging task even before pandemic (Panigrahi, Srivastava & Sharma, 2018) despite all the benefits this way of knowledge acquisition brings along (flexibility of time and place, cost-effectiveness, improving technical skills, time management, etc.) (Gautam, 2020; Arkorful & Abaidoo, 2014). It is also well known that effective online education highly depends on careful planning and sound instructional design, using a systematic model for design and development (Branch & Dousay, 2015; Hodges et al.,

2020). In the case of an emergency, like the one we all faced at the beginning of the pandemic, the fast reaction was essential, meaning that most online courses were not planned and organized systematically. Practically oriented courses were another problem, considering they could not easily be adapted to the online format. It most certainly affected the learning outcomes and other factors in students' perception of online teaching.

Many of the studies published during 2020 and 2021 were dedicated to the effect of Covid-19 on the educational sector. They covered the topic from the aspects of students' performance (Gonzales et al., 2020), their mental health and motivation (Copeland et al., 2021; Zacolletti et al., 2020), challenges, opportunities, and satisfaction (Adedoyin & Soykan, 2020; El Refae, Kaba & Eletter, 2021; Barrot, Llenares & Del Rosario 2021), their perception of online approach (Bączek et al., 2021; Cranfield et al., 2021), etc. The results often accentuate different factors, which is no surprise considering social and cultural differences, and the fact that each institution responded differently following the situation in its country. An international study conducted by (Cranfield et al., 2021) revealed that the most important differences are related to the learning environment, engagement, participation, and perception of impact on learning skills.

In the case of our institution, adaptation to the online classes was relatively fast and efficient. The online mode started in March 2020, and all the courses were synchronous (Arkorful & Abaidoo, 2014), following the pre-established timetable. Classes were initially held over Zoom, while everything else (sharing the materials and information, activities) was done via the University of Novi Sad Moodle-based online platform, developed long before the pandemic. From the winter semester of 2020/2021, a shift was made to Microsoft Teams and the new remote learning platform, thus creating a slight change in communication with the students – chat option in Microsoft Teams had become the predominant way of communication between students and lecturers.

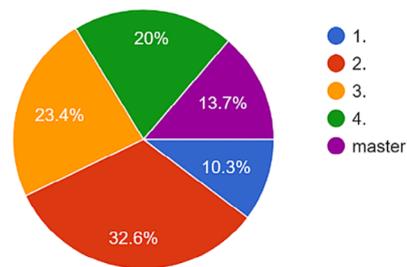
Even though the adaptation to the learning management systems went smoothly for both parties, it was just one building block of the online teaching/learning process. As stated by (Hodges et al., 2020), lectures are only one aspect of the whole educational system, which is formed to support learners with formal, informal, and social resources. In the situation we were all in, it became clear that the support in all three segments was more than necessary.

Taking all into consideration, the purpose of this inquiry was to determine how students in our department perceived online learning during the Covid-19 pandemic. The goal was not to compare the online learning approaches or make a qualitative investigation on the difference between traditional and online class-

es, but rather to better understand all the problems and challenges they were facing and the advantages this new way of transferring knowledge has brought so far. The aim was also to pinpoint the factors that impede the knowledge transfer and those that could be changed to improve the learning process.

## Method

To gain insight into our students' perception of online learning, we formed an anonymous online survey which was filled out on a voluntary basis. One hundred and seventy-six students, all aware of the purpose of the study, took part in it during April and May of 2021. Eighty percent of the students were female, and most were in their undergraduate studies (Figure 1). Only 8% of the students had prior experience with online learning (Google Classroom, different online courses, online conferences, workshops, etc.).



» **Figure 1:** *Distribution of respondents by the year of study*

The survey consisted of single-select and multi-select multiple-choice questions, where the latter were predominant and often allowed adding the missing answer. Predefined choices were determined on the basis of the studies dealing with the effect of the Covid-19 pandemic on higher education, overviews on e-learning (Gautam, 2020; Arkorful & Abaidoo, 2014; Adedoyin & Soykan, 2020; El Rafae, Kaba & Eletter, 2021; Barrot, Llenares & Del Rosario, 2021; Copeland et al., 2021; Zaccoletti et al., 2020; Cranfield et al., 2021), problems authors have noticed while teaching (Tomić et al., 2021), and their communication with the students during online classes. In addition, we used open-ended questions to allow students to elaborate preferences, describe problems more in detail, and give suggestions about possible improvements.

Questions evaluated different aspects of online learning: conditions in which online classes are attended, communication channels (including questions about platforms and applications used), problems and how they are dealt with, understanding and motivation.

In the first set of questions, students gave feedback about their learning environment and the equip-

ment they were using when attending online classes. Next, they were encouraged to reflect upon the technical and other problems they were facing, share the main distractors in their environment, and how they reacted when faced with those difficulties.

The second set of questions was formed to determine whether the students had any problems to adapt to different platforms and software and which software/platforms they preferred. Also, we wanted to determine which option they choose when communicating with lecturers (e-mail, chat, video calls, etc.) and why.

Questions in the third set focused on their understanding and motivation. We were curious to find out what were the main obstacles to understanding the teaching material, and how the students reacted when they fail to understand or to catch up with the classes. Also, we evaluated if our students struggle to motivate themselves in conditions that are not so common to them.

Ultimately, students were asked to evaluate their efficacy and activity in the previous period. They were also asked to give opinions about the advantages and disadvantages of online learning and to share their preferences.

## Results

The results of the survey showed that the majority of our students (98.9%) followed online classes from their homes, where they mostly used laptops (48.9%), mobile phones (17.6%), and the mobile phone-computer combination (43.8%). More than one device was used in situations when they had to replicate what the lecturer was presenting.

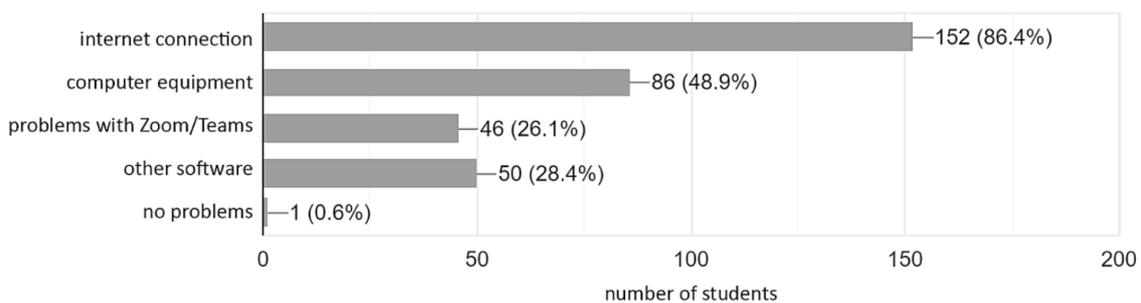
Students mostly encountered problems with the internet connection, with their own devices (memory, sound and camera issues, etc.), the software necessary for computer labs, and video conference software (Figure 2). Of all the technical problems, the issue with not having enough RAM to run both Microsoft Teams and other software was reported the most often. Our students try to solve the problems independently before asking for help either the lecturer, colleagues, or both parties.

Of problems not related to the equipment, the majority of the students reported lack of motivation (69.9%), lack of direct communication with their classmates (67.6%) and lecturers (33%), and the inability to concentrate due to the distractions in their surroundings (52.8% of students reported this problem).

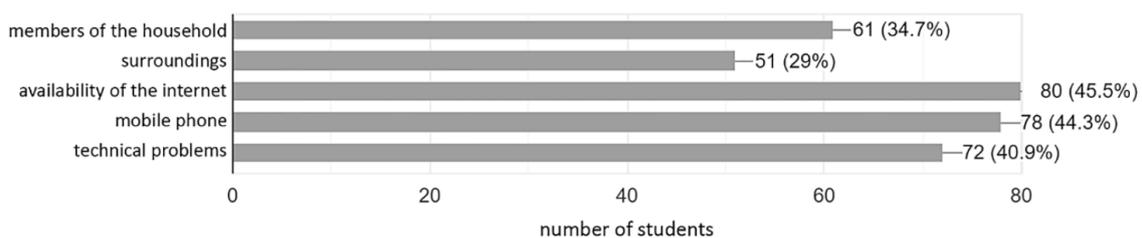
As the central distractor, they pinpoint the availability of the internet connection and the accessibility to their mobile phones, meaning they could easily access their social media, instant messages, etc. Technical issues, household members, and surroundings were also listed very high among the distractors (Figure 3).

When distracted, our students often try to overcome (67.2%) or ignore the problem and continue with the class (7.5%). However, an alarming number of students (21.8%) find it impossible to continue following their courses once they get distracted. We believe that the lack of motivation reported before, lack of self-discipline, and the overall feeling of lethargy lead to such a reaction.

Only 14.2% of our students reported problems adapting to the software used in online teaching (Zoom, Microsoft Teams), where 79% of them prefer Microsoft Teams over Zoom, and 15.9% have no preference.



» **Figure 2:** Problems students encountered during online classes

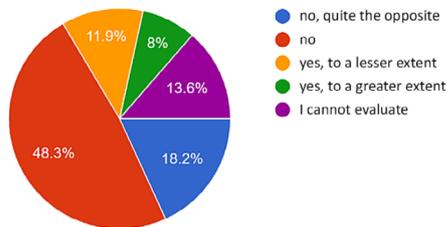


» **Figure 3:** The main distractors, as reported by the students

The main reason for choosing Teams over Zoom was "having everything in one place" – calendar with the timetable, chat, class files, etc. It is worth noting that since the introduction of Microsoft Teams, student-lecturer communication significantly shifted from e-mails to direct chatting via Teams. Students prefer this type of communication since it is more direct, and they obtain the answers much faster. On the other hand, there was no clear preference for one online platform over the other, and most of the students didn't report significant problems adapting to any of them.

Our students reported a lack of both motivation and concentration during online classes. Different reasons were mentioned for this, some of which are listed as follows: not seeing the professor face-to-face, technical issues, lack of interaction, too much computer time, social isolation. For 48.9% of them, the most difficult was to follow computer labs, 8.5% reported trouble focusing on laboratory sessions, while 31.3% had difficulty concentrating on lectures.

When estimating the attendance, efficiency, and information adoption, we disregarded the responses of first-year students since they were objectively unable to compare their performance before and after the pandemic. Nevertheless, almost half of our examinees think that the online regime did not increase their attendance to lectures and labs, while some even reported their attendance decreased (Figure 4).



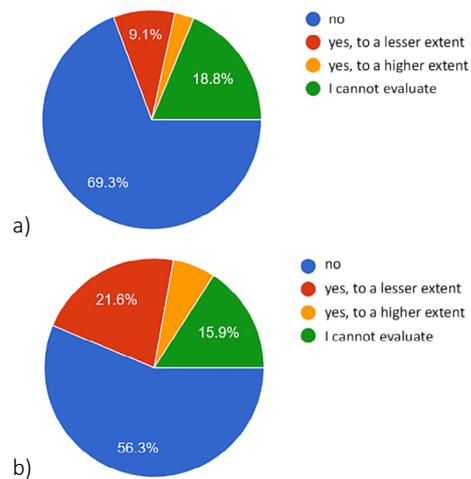
» **Figure 4:** Students' opinions on whether the online regime increased their attendance to lectures and labs

Also, most of them think that online teaching did not improve the information adoption during classes (Figure 5a), nor their efficiency in finishing tasks and projects (Figure 5b).

As the main advantages of online learning our students highlighted the possibility to attend classes from any location (77.8%), to adapt the learning environment to their preference (47.7%), and the feeling of privacy (27.8%). In addition, online classes enabled some of them to stay with their families and feel more secure, and others to combine work and study.

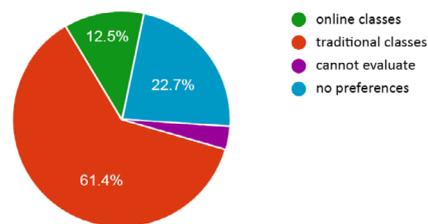
The drawbacks students highlighted were: lack of social connection (77.3%), lack of focus and motivation (73.3%), too much computer time (55.7%), feeling of

isolation (42.6%), and the fact that classes can easily be interrupted due to the technical problems (76.7%). In this case, we believe their opinions on online teaching are highly influenced by their emotional state and the feeling of uncertainty they had to deal with. Responses to the open-ended questions confirmed our assumption. Multiple answers were focused on mental health and the necessity to deal with stress and anxiety. Some students suggested making classes more interactive, with more breaks and more communication, even unrelated to the topic of the lecture. Others highlighted the importance of video and interactive presentations and acknowledged the good practice of using class recordings and video tutorials.



» **Figure 5:** Students' answers to whether the online teaching (a) increased the information adoption during classes, (b) increased their efficiency in finishing tasks and projects

Taking all into account, it is no surprise that more than half of the students preferred the traditional form of teaching over online (Figure 6).



» **Figure 6:** Students' preferences

However, more than 20% is indecisive, stating that both forms of teaching have their advantages, while only 4.5% of students preferred online classes over traditional ones. The results do not change much if we exclude the responses of the first-year students (considering they didn't have any prior experience with conventional courses at our department).

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## Discussion

If we compare our survey results with similar reports, it is clear that our students do not differ significantly from the others. Their technological and digital literacy made them well prepared to handle online classes and easily switch from one software to another. Still, they were not less resistant to the stress and anxiety than all the others who were in the same situation. It is clear that the pandemic affected our students' attention and motivation, which was also acknowledged by other authors (Copeland et al., 2021; Zaccoletti et al., 2020).

The problems they were facing were also quite common, as well as the reported distractors (Barrot, Llenares & Del Rosario, 2021; Adedoyin & Soykan, 2020; El Rafee, Kaba & Eletter, 2021; Bączek et al., 2021). The study conducted by Tang et al. (2020) among engineering students showed that they are mostly dissatisfied with online learning in general, especially in the aspect of communication. Our students highlighted that they were missing face-to-face contact with their fellow students and lecturers; some even mentioned it affects their motivation. Limited interaction, lack of facial expression, and body language are the key challenges to distance learning (Georgiou, 2018) and are still to be overcome. Some of the main advantages of the online approach reported by other authors (Bączek et al., 2021; Adedoyin & Soykan, 2020) were also noted by our students: the ability to learn from any location, comfortable surroundings, and a sense of privacy. Same stands for disadvantages.

On the other hand, unlike the results of (Gonzalez et al., 2020), who reported a significant positive effect of Covid-19 confinement on students' performance, our results were just the opposite. Students reported lower performance in information adoption and efficiency, which was somewhat confirmed by the lecturers (Tomić et al., 2021).

## Conclusion

In this inquiry, we wanted to find out the main challenges and problems students at our department have faced due to the transfer to online learning induced by the Covid-19 pandemic. Also, we wanted to examine the efficiency of the online learning approach in the current situation and its benefits in the long term.

First of all, we would like to point out that it is clear that the opinions of our students were highly biased by their psychological state. In the moments of uncertainty and pressure, a sense of social isolation had made many students feel unmotivated, with the lack of focus and drive for learning. The lack of concentration and attention can also be attributed, to some extent, to the distractors in their environment. The central distractor for our

students were their mobile phones and the fact that they could easily access their social media and engage in other forms of out-of-class communication. Technical issues were also listed very high among the distractors, as expected, and the members of their household and their surroundings. Even though our students reported many problems with computer equipment and internet connection, they didn't have any issues adapting to online platforms or communication software, where it is clear that the majority prefer Teams over Zoom. Teams chat option almost entirely substituted e-mails and other forms of speaking with the lecturers since it is seen as a more direct way of communication. On the other hand, the lack of motivation seems to result from social isolation, lack of interaction, and too much computer time.

Our students think that the main advantage of online learning compared to the traditional form is the flexibility (connecting from any location and environment). The highlighted drawbacks were: lack of social connection, too much computer time, lack of motivation, and the feeling of isolation.

Students in our department reported less attendance to online classes, less information adoption during lessons, and a decrease in their efficiency in general. Furthermore, our lecturers confirmed that the students' performance in the last period did decrease to some extent compared to the pre-pandemic results (Tomić et al., 2021). Hence, it is no surprise that our students prefer traditional teaching over virtual.

Evidently, there is still a lot of space to improve the online approach and make it more attractive and engaging for both parties. We believe that the interaction should be imperative and that all future efforts on improving online learning should go in that direction. In addition to that, we are firmly convinced that it is crucial to motivate and psychologically support students in times like these, since it is clear that both their well-being and academic success depend on it.

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