

E-LEARNING IN THE CZECH REPUBLIC DURING THE SECOND YEAR OF PANDEMIC COVID-19

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Abstract: The aim of this research is to map the situation of online education in the Czech Republic and compare it with the European one. The research was conducted based on data provided by the Czech Statistical Office and Eurostat. The evaluated data were subsequently compared with findings from the literature search. The findings show that the usage of online courses is 20,8% more than the average in the EU27. And the use of online education materials in the Czech Republic, like the EU27. Online learning is still evolving, it has issues due to the lack of experience, but the potential is growing over time.

Keywords: E-learning, covid-19, online learning, students, online materials

1 Introduction

The Internet has become one of the most significant parts of our daily lives. Internet usage accounts for an average of 40% of the daily time, which is nearly 7 hours (Kemp, 2020). This means that the average person who sleeps 8 hours daily spends 43,8 % of their day on the Internet.

The pandemic of Covid-19 came with a lot of changes. Almost every country in the world was impacted by this, and it affected every section of our daily lives—health care, economy, travelling etc. One of the most impacted segments was education. The COVID-19 pandemic has led to a significant change in training behaviour in ophthalmology towards e-learning and online courses, which has not been accompanied by a general decline in a training activity (Kamouna et al., 2022). The Czech Republic during 2020 and 2021 mostly switched to online courses, starting from grammar school to university. Due to the devastating Covid-19 outbreak and the implementation of national lockdown in many countries, teaching and learning across the world's universities has consequently shifted from the usual traditional class-based to online. While the conventional approach has been preferred by most academics and students, adjusting to online learning posed a new challenge to academic students (Mseleku, 2020). This backs up the statement from Jafar (2022) in his paper, he said that the outbreak of the COVID-19 pandemic had transformed the education system in most countries worldwide (Jafar et al., 2022). During the COVID-19 pandemic, some instructors transitioned their courses into a fully online environment by adopting flipped learning (Lo & Hiew, 2022). For many students, it was beneficial; it cut their transportation costs, and for some, it was better so they could study in their homes in a more peaceful environment. Among the major advantages of e-learning is not only improving students' learning experience and widening their educational prospects but also an opportunity to gain insights into students' learning processes with learning analytics (Deeva et al., 2022). The student could spend more time focusing on learning. And some research even shows that only listening technique is better for studying. The results suggested that studying by oneself rather than simply listening to lectures enhanced the effects of the discussions and led to higher learning outcomes. In addition, the effect of the instructor's intervention in the middle of the discussion varied depending on the pre-learning activities of the discussion (Lim et al., 2022).

2 Literature Research

The education segment was forced to start from nothing in 2020 and 2021, and the return to digital education was better for students and teachers since they had some experience from the year before. Digital learning (DL) is well-placed to cater to these needs, as it provides teaching options that can be delivered flexibly and on demand from anywhere in the world (Kok et al.,

2022). The usage of e-learning cannot be pushed into all the study fields. For example, it is very unsuitable for medical studies. As Delungahawatta et al. (2022), said in their research, that, e-learning is recognised as a useful educational tool and is becoming more common in undergraduate medical education. E-learning is compatible with flipped learning; however, it is considered to be unsuitable for providing training on surgical techniques (Okada et al., 2022). Many educational institutions have been forced to close due to the sudden COVID-19 outbreak, and many students have been forced to stay at home and take online courses (Amaechi et al., 2022).

E-learning is achieved by the deep integration of modern education and information technology and plays an important role in promoting educational equity (Qiu et al., 2022). E-learning, online learning, and distance learning are all of those mentioned here before, but the start of the pandemic of covid-19 gave them a much more needed push to becoming a noticeably big segment in today's education. Students will check online content before performing procedures for the first time (74.8%), to understand what was explained in class (65.9%) or read in books (59.5%), to relearn clinical techniques (64.7%) and to visualise rare procedures (49.8%). (Dias et al., 2022) Most of the students are happy that most of the theoretical lectures become online. Students were highly accepting of lectures and seminars conducted in the form of e-learning, but not a laboratory and clinical classes (Dyrek et al., 2022).

The emergence of the Covid-19 pandemic undoubtedly resulted in devastating socio-economic challenges across the world (Mseleku, 2020). For this reason, traditional education and training have shifted to an online learning format (Al Shamari & Farooqui, 2022). In many forms, we can see online learning formats in online classrooms, sharing learning materials online, video courses and many more. The adoption of e-learning in response to COVID-19 is to ensure the continuous development of human capital through alternative means. Nevertheless, the success of e-learning systems depends much on the attitude of the users (Osei et al., 2022).

The positive that comes from switching to online education is the range. You can study from everywhere, and thanks to some online courses you can study anytime you want. The features accessibility, flexibility, intractability, and visualization with the characteristics of remote accessibility and flexibility, repetition and retrospect, feedback requests, and visualised analytical reports were considered to enhance learning outcomes (Liao et al., 2022). Not only the visualization but students had to think more since "they were on their own". The learning practices were positively associated with the thinking processes and the thinking processes were positively associated with students' basic science-related clinical ability (Liang et al., 2022).

There are many positives coming from e-learning but there are some negatives too. According to Dyrek et al., (2022) the main problems in e-learning are the quality of the classes conducted and the Internet connection. The students expect e-learning classes to be conducted in real-time, with direct, face-to-face contact with the lecturer (Dyrek et al., 2022). The technical issues with the personal or psychical problems of students can add up to more problems. In addition to technological issues, the majority of students cited psychological and social factors as reasons for their negative attitudes toward e-learning, such as a lack of readiness and ability to adapt to a new style of education, the ineffectiveness of the means and methods used, and poor communication with teachers and other classmate learners (Rabayah & Amira, 2022). And the study from Azmi et al. (2022) shows that, about half of the students were associated with increased depression. The outcome also indicated that female students experienced extreme depression, stress, and fear of examinations more than males (Azmi et al., 2022). This is proven also by research done by Zhou et al. (2022). We found that online courses with inappropriate characteristics were

associated with children's mental health. The findings called for efforts to optimise online courses and improve children's mental health (Zhou et al., 2022). Factors affecting the results of e-learning can be everywhere. The results show that a combination of organizational, technological, environmental and behavioural factors affects the efficacy of e-learning (Manjeese, 2022).

One of the worst problems was the adaptation to this new system of education, the university students for example had to switch to remote lectures instead of practical training in the laboratory. In Science this pandemic there have been tectonic shifts in the education sector. Effective implementation of e-learning in higher education depends on students' adoption of this technology (Chahal & Rani, 2022). Thanks to all of these experiences we can be more prepared for the future problems that could bring online education back, according to Subashini et al. (2022), adopting E-learning into the higher education sector could be recognized as a viable solution to facilitate the higher education during a crisis like COVID (Subashini et al., 2022). The students had to become more independent. In times of heavy restrictions, most of the libraries were closed. Students had to for their thesis find all the resources online. But there are more problems with that. Thanks to a lack of information on how to cite or use electronic resources some students could even end up doing electronic crimes. This was the focus of Ayyoub et al. (2022) research done at the University of Jordan. This indicates students' lack of awareness of the effectiveness of procedures and penalties for electronic crimes that can be applied in e-learning due to the rapid transition in the learning process (Ayyoub et al., 2022). However, the actual use by teachers appears to be primarily dependent on personal and technological factors. Similarly, 91% of the variability of the use of e-learning tools by librarians can be explained by organizational, personal and technological factors, with the personal factors having a negative impact on the actual use (Lopes et al., 2022). But it does not mean online learning is the only bad. Therefore, higher education institutions that aspire to benefit the most from the e-learning system should pay close attention to the aspirations of their students and enhance their enjoyment, and then redefine the "e" in e-learning as enjoy rather than simply electronic (Bessadok, 2022). The results from Li et al. (2022) indicate that online learning mode is more likely to reduce the academic performance of lower-grade students (e.g., freshmen and sophomores). The learning environment could be one of the essential factors affecting academic performance during online education. Studying at home or dormitory is more evidently correlated with academic performance decline (Li, et al., 2022). One study showed that a growth mindset can influence positively neonatal resuscitation performance after an e-learning simulation (Spénard et al., 2022).

But the problem is not only with the students. The teaching techniques needed to change the approach to e-learning. According to Matviichuk et al. (2022) the an urgent need for training experience, organization and implementation during wartime because of the fact that both the educational process and the opportunity to obtain an education should not be halted (Matviichuk et al., 2022). It can be challenging for teachers to engage students online; to know whether students are engaged or not. Online engagement can be perceived differently than in-class engagement (Bergdahl, 2022). The other study shows that students may have trouble focusing due to a lack of teacher-student interaction yet online learning has some advantages that are unavailable in traditional classrooms (Dong et al., 2022). In a study done by Hensen et al. (2022) a sense of community is linked to and facilitated by the online learning environment and the educators' and students' roles throughout the course. This study found that interaction and inclusion can be augmented by a hybrid educational design and supported by the mutual efforts of educators and students (Hensen et al., 2022).

3 Methodology and Data

The data used for this paper are from the Czech statistical office. Specifically, the data set called Use of ICT in Households and by Individuals - 2021 (Czech only). The data were conducted in the form of a personal interview using a personal computer on a selected sample of about ten thousand. Persons aged sixteen and more who live in private households in the Czech Republic.

The reference period for questions about the use of the Internet on selected devices, internet activities and educational activities on the Internet is the last 3 months before the investigation.

Data for international comparison comes from the Eurostat database for the digital economy and the company, the last update in January 2020. Tables and graphs with international comparisons for EU countries are presented as a percentage of the total number of students in the country.

The chosen categories for this research are:

- Students older than 16 years in EU countries using the Internet (in the last 3 months),
- Using inter participating in online course,
- Using online teaching material.

Participation in the online course - a teaching course that takes place over the Internet. Communication with teachers takes place via the Internet, also the teaching materials are sent online. Online courses include language courses, personal development courses, computer courses and more. This also includes courses made through applications such as Duolingo.

Using online teaching material - includes education on websites or in applications using audio, video or text materials or online teaching software. There are no teaching materials that are downloaded from the Internet and used offline (without an Internet connection).

The research was done by comparing the data from the Czech statistical office with finding from literature research. Based on the keywords associated with this research. Such as e-learning, online learning, online course and more.

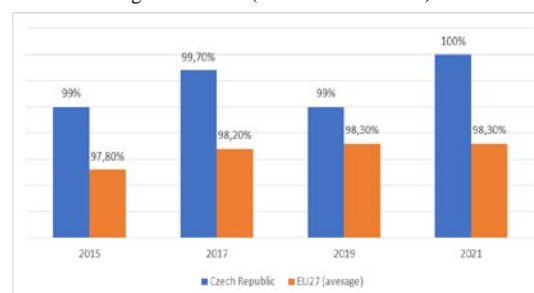
4 Results

Based on data from the Czech Statistical Office, specifically the use of information technology students (2021), several conclusions show.

Based on the data, it is possible to determine the use of IT students, which indicates a sample of approximately 10,000 students, for more than 16 years. We can learn the following.

First, we can see from the data that Students older than 16 years in EU countries using the Internet (in the last 3 months) compare the data from the Czech Republic to the average usage in the EU.

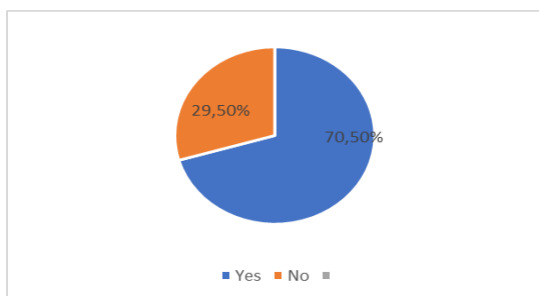
Figure 1: Number of students older than 16 years in EU countries using the Internet (in the last 3 months)



Based on the data showed in Chart 1, we can see that the Czech Republic is above average usage of internet compared to the usage of internet in EU. The data from Czech Republic shows, that the trend is going to be 100 or almost 100% usage in the next years, thanks to the internet still evolving and becoming one of the most important things in today's teenagers live.

This corresponds with the statement from Kemp (2020), in his research he confirmed that nearly 7 hours we spend on average on the internet. This trend is confirmed that 100% of students use the internet.

Figure 2: Participation in an online course



Based on the data shown in Chart 2 that from the data 70,5% of students over 16 participated in the online course. This shows that even younger students show interest in online courses, this can be heavily based on the required usage of online courses due to schools switching to online courses due to the pandemic of Covid 19.

If we go even deeper into the data, 71.8% of men over 16 and 69.1% of women over the year sixteen participated in online courses. The expansion of online courses is imminent. This data show not only the usage of internet courses provided by the school but also shows the use of online courses outside the school like Duolingo etc.

Figure 3: Using online teaching materials

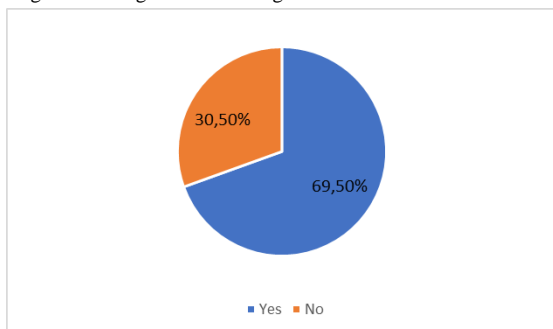
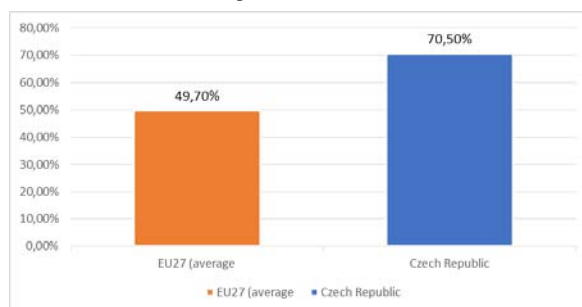


Chart 3 shows a similar trend in using online teaching materials. 69,5% of participants used some in the 3 months prior to the study some online materials. Based on gender we can see that 71,8% of men and 67,8 of women over the age of sixteen used online materials. The usage of online materials corresponds with a statement from Liao et al. (2022) that flexibility, accessibility, visualisation etc. were proven to enhance learning.

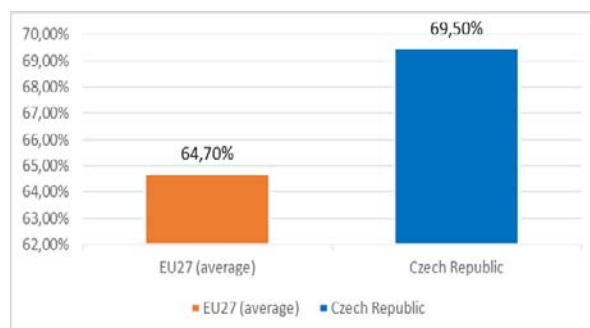
For a comparison of e-learning in the Czech Republic and EU27, I used the data provided by Eurostat to show very different results.

Figure 4: Participation in educational activities on the internet with students 16+ (EU compared to CZ)



Based on the data shown in chart 4 we can see that only 49,7% on average in the EU27 interacted in educational activities but only in the Czech Republic, 70,5% used participated in said activities. This shows the importance of education in the Czech Republic. And the will to the continued effort to educate students even during the pandemic.

Figure 5: Using online teaching materials (EU compared to CZ)



In chart 5 we can see the comparison of using online forms of teaching materials. There we can see there is not much of a difference between the Czech Republic and the EU27. It shows that most of the countries in the EU provided their students with online learning materials. But in comparison to online courses, it shows that the usage of just online materials is more common

5 Discussion

The application process of learning has undergone major changes over the past two years, one of which was the adaptation to online learning. The results vary based on geographical territory. If we focus only on the Czech Republic, it shows that the effort to educate students is strong. Almost 71% of students over the age of sixteen participated in educational activities. Meaning webinars, online classrooms, educational courses etc. The usage of online education activities coming not only from schools but also from the student's free time corresponds with the results from Sivaramalingam et al. (2022). Our results showed that the students were satisfied with the webinar teaching and acknowledged it to be an effective tool in the teaching-learning process to gain new knowledge and wish to attend webinars in future as a part of their curriculum. Thus, webinars have a constructive effect on the teaching and learning process in professional courses during the pandemic lockdown (Sivaramalingam et al., 2022). This also can be found in the study by Mohamed et al. (2022). This study finds that improving and enhancing student factors and system quality is critical for students' satisfaction with e-learning. Furthermore, e-learning platforms should contain new advances in computer-mediated technologies that enable collaboration, which is a critical factor in the success of e-learning systems (Mohamed et al., 2022) The usage of online materials is becoming more and more imminent in our future. Since it has more benefits than negatives. One of those can be the saving of paper for printing the materials. Objectives Increased exposure to digital devices as part of online classes increases susceptibility to visual

impairments, particularly among school students taught using e-learning strategies (Cortés-Albornoz et al., 2022).

The online learning format however still has many problems. The technical issues, but we have to keep in mind that the students tend to be more struggling with mental issues thanks to the lack of social contact and world events. The coping strategies used by students ranged from support from family and counsellors, help-seeking, frequent communication, time management, and learning flexibility to control the learning environment (Okyerere et al., 2022). One of the problems that can be found in the teachers, is that most don't have that much experience with online learning. The relationship between the instructor role (instructor support, instructor-student interaction and instructor innovation) and students' approaches to using online learning technologies highlight the importance of instructor support and innovation in facilitating students' adoption of desirable approaches to learning from the application of technologies (Wang et al., 2022).

6 Conclusion

The usage of the online learning era was pushed even further thanks to the pandemic of Covid-19. During the pandemic, online learning interaction became more frequent among course network members whose interaction scale increased. After the pandemic, although the scale of interaction declined, online learning interaction became more effective (Zhang et al., 2022). Online education had become one of the only forms how to educate students during the lockdown in the Czech Republic. Online mode of education has been identified as the subtle solution to continue learning during the pandemic (Shafana et al., 2022).

From the data provided by the Czech Statistical Office and the Eurostat, we can see that in the year 2021 that 70,5% of students over the year sixteen participated in some online courses, which is 20,8% more than the average in the EU27. This shows that the Czech Republic has priority to still educate their students even during the lockdown. The data also shows that the students used not only online courses provided by the school but also educated themselves in their free time.

The usage of online materials is almost the same in the Czech Republic (69,5%), and the EU27 (64,7) making the difference just 4,8%. Online materials are more common now than ever since all the students and teachers were forced to work together online, based on the data and literature research the usage of online materials will become more important in the future. Even with the technologies latest trends, students nowadays use more technologies than traditional books and papers. Expectations regarding technology-mediated learning post-COVID-19 are mixed, hampering planning for the future. Hesitancy about teaching or taking courses with some or full online components persists (Guppy et al., 2022).

Because of the pandemic, schools needed to change their old learning activities and become more online, than ever before. The students proved that online learning is beneficial for them and the teachers. But it still has many issues which must be resolved for the future of online education. Overall, the perceived effectiveness of e-learning among students and teachers has not changed significantly over time. Nor have students' preferences shifted significantly for various learning modes after in-person learning resumed. However, informative directional trends have emerged (Li et al., 2022).

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Primary Paper Section: A**Secondary Paper Section: AM**