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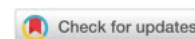
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The Quality of Online Higher Education Teaching During the Covid-19 Pandemic

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Abstract: This paper presents a study of online teaching in higher education during the 2021/2022 school year, during the Covid 19 pandemic. The theoretical foundation of this research is Community of Inquiry (Col) framework, according to which online teaching is realized through social presence (students' interaction), teaching presence (student-teacher interaction) and cognitive presence (student-content interaction). This quantitative research was conducted in six countries: Serbia, Croatia, Bosnia and Herzegovina, Slovenia, Romania and Russia, and the answers were received from 808 students. At all participating faculties, online teaching was applied during the observed period, and in almost 80% of cases it was realized in full or to a greater extent than in in-person classes. The aim was to determine Col presences and to identify possible differences among countries. The obtained data was processed with quantitative descriptive analysis and Kruskal–Wallis H test. The highest values of Col presence were noted in Russia and Romania, then Slovenia and Croatia, and the lowest in Bosnia and Herzegovina and Serbia. In the whole sample, teaching presence has been most represented, followed by social presence, while the cognitive presence has been scored the least. Entire Col presence was assessed as partially represented, as well as its three elements, the lowest of which is cognitive presence. In order to improve the online teaching process, in this paper technological and pedagogical training of teachers for online teaching, support for students for the use of digital tools for online learning and the provision of IT experts as necessary technical support are recommended.

Keywords: online teaching, Community of Inquiry, higher education, research, student.

Introduction

With the global Covid-19 pandemic, the world's education systems have faced a significant challenge - finding strategies to stop the spread of the virus. According to UNESCO data, by May 2020, the closure of educational institutions affected more than 1.21 billion students, almost 70% of the world's student population. In order not to lose the school and academic years, educational institutions at all levels have developed an urgent model of online education, which adopts the policy of "disrupted classrooms, undisturbed teaching" (Huang et al., 2020).

The organization of online higher education is a complex task at the pedagogical, organizational, infrastructural, economical, and even sociological level. However, it was not equally challenging for all higher education systems and institutions. For those with more experience in implementing online teaching, this was not a difficult task. Among them are higher education institutions from the United States, Great Britain, Asia and European countries. Higher education institutions and systems that first faced this challenge were in a position to organize online teaching that had not been tested before and all problems had to be solved ad-hoc (Rapanta et al., 2020).

Effective online teaching is far from urgent and improvised: it requires a different design from traditional teaching, which often cannot be projected into an online environment. Furthermore, experience shows that effective online teaching should have a pedagogical approach that creates a meaningful online learning experience, where students are motivated and engaged; not left in a passive position (Rapanta

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et al., 2020; Huang et al., 2020). For these reasons, it is extremely important to provide an evaluation of the online education that was realized in the conditions of the Covid-19 pandemic. The most effective and precise way to examine it is addressing the so-called Community of Inquiry model in online teaching (Col).

Developed by Garrison, Anderson and Archer (1999), this model is widely approved, and insures successful learning in an online environment. It implies a development of the community that supports meaningful and deep research-based learning, meaningful learning and knowledge sharing. The model is based on three types of presence: social, teaching and cognitive presence.

The teaching presence comprises a range of roles, activities, pedagogical forms and interventions that the teacher undertakes in order to enable interaction with students in the online learning process. Swan (2003) identified six best practices for teaching presence: establishing clear learning aims and instructions for students; using a wide range of presentations of course content; developing learning methods or exercises that enable students to be active and to be involved; providing students with feedback; being flexible in ways of achieving learning outcomes; and providing students support and mentoring as much as possible. The second element of the Col model is **Social Presence**, which represents the extent to which students feel socially and emotionally connected to others and to the online environment in which they learn. The specificity of the online environment gives a special challenge to this element, and many consider the existing tools to be inadequate and inefficient in replacing live models. Research has shown that social presence can and should be established in online learning communities (Swan et al., 2008). The third element is **Cognitive Presence**, and it represents "the extent to which the learners are able to construct and confirm meaning through sustained reflection and discourse" (Garrison, Anderson and Archer, 2001: 11). Cognitive presence includes the following phases: phase of developing students' interest in the subject through the setting of a learning problem, a phase of researching and reflecting on problems and finding possible solutions, and a phase of problem solving and its application (Garrison and Archer, 2003). These phases are initiated and organized by the teacher, but to a large extent they are also the result of the social interaction between students, because it is feasible in an atmosphere of proactivity, dialogue and reflection. The three elements of the Col model are interrelated—the teaching presence is the design, facilitation, and direction of social and cognitive processes for the purpose of accomplishing personally meaningful and educationally worthwhile learning outcomes (Garrison, Anderson and Archer, 2001).

Numerous studies have been conducted to test and validate the Col model in online education (e.g., Garrison and Arbaugh, 2007; Arbaugh et al., 2008; Swan, Garrison and Richardson, 2009; Garrison, Cleveland-Innes and Fung, 2009; Akyol and Garrison, 2011). Nowadays - twenty years after its inception - the Col model has become indispensable and reliable in the theoretical understanding and practical research of online education.

This paper therefore presents an international survey of online teaching in higher education during the 2021/2022 year, using Col model.

Materials and Methods

The main aim of this paper is the international evaluation of online teaching in higher education that was realized in the school year 2021/2022 during Covid-19 pandemic. Online teaching has been evaluated through the prism of the Community of Inquiry model developed by Garrison, Anderson and Archer (2001). Specific goals are:

1. determining the teaching, social and cognitive presence as individual dimensions of online teaching on the whole sample and among the examined countries,
2. determining the entire Col presence in higher education among the examined countries and on the overall sample, and
3. determining the differences among countries regarding Col model and its dimensions.

The research was conducted from October 2021 to January 2022 in higher education institutions in six countries: Serbia, Bosnia and Herzegovina, Croatia, Slovenia, Romania and Russia. The sample was chosen as the countries are in different stages of economic and technological development and are all in Europe.

The data was collected through the questionnaire using the survey technique. Research participants were higher education students. The participation in the research was voluntary and anonymous. A semi-closed instrument with categorical or numerical responses was used. In addition to general data on respondents (college, country and field of education), the instrument includes a scale of online teaching assessment based on the Community of Inquiry model. Customized version of the Col instrument was

used (Arbaugh et al., 2008). The instrument is validated, tested and measures three elements of online teaching: teaching, cognitive and social presence.

The research is quantitative. The obtained data was processed by a statistical method and edited with quantitative descriptive analysis in IBM SPSS 20.0 software package (trial version). Frequencies and percentages were used to process categorical data, and on numerical scales - arithmetic mean and standard deviations. Kruskal–Wallis H test was used to determine the differences among the examined countries in teaching, social and cognitive presence and in the entire Col presence.

Research sample

There had been 808 collected complete responses of higher education students from six countries: Serbia, Bosnia and Herzegovina, Croatia, Slovenia, Romania and Russia.

Table 1
Respondents by countries

	Frequency	Percent
Serbia	249	30.8
B&H	69	8.5
Croatia	72	8.9
Slovenia	38	4.7
Romania	176	21.8
Russia	204	25.2
Total	808	100.0

Although the difference in the Col elements between the field of education had not been confirmed in earlier research, we wanted to provide all fields of education in a sample. Therefore, the sample consists of students of all areas of education (Table 1).

Results

General information about online teaching

In order to analyse the aspects of the quality and effectiveness of online teaching during the Covid-19 pandemic, it is necessary to gain a general picture of its nature and representation. Hence, the presence of online teaching was examined.

Table 2
The extent in which online teaching was represented

	Frequency	Percent
Completely	420	52.0
To a greater extent	203	25.1
As much as in vivo	106	13.1
To a lesser extent	75	9.3
Total	804	99.5
Missing	4	.5
Total	808	100

During the Covid-19 pandemic, the online model of the teaching process was dominant – according to more than half of the respondents it was fully represented; according to a quarter of them, it was present to a greater extent. Given that the research subject and goal presuppose a high level of online teaching; these results represent a favourable research context (Table 2).

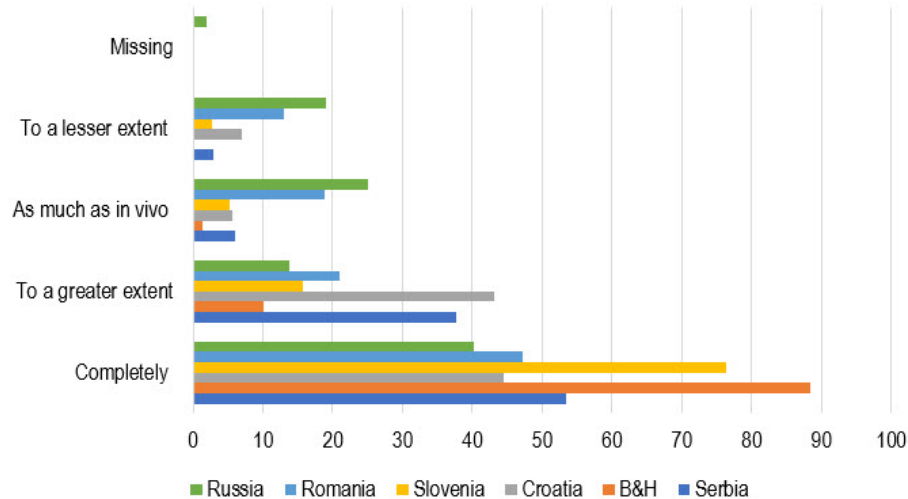


Figure 1. The extent to which online teaching was represented by countries

In Bosnia and Hercegovina, Serbia and Slovenia teaching process has been organized online almost exclusively, while in other countries, especially in Romania and Russia, there have been lectures in vivo as well (Figure 1).

Exploring Col elements

In accordance with the main issues and the goal of the paper, three elements of the Col model were examined: Teaching, Social and Cognitive Presence in online higher education, as well as their differences among countries.

Statistical analysis of the Kruskal-Wallis H test showed that there are statistically significant differences between examined countries in their teaching, social and cognitive presence as individual dimensions of online teaching. Moreover, there are statistical differences between the examined countries in the entire Col presence (Table 3).

Table 3
Statistics of differences in Col elements by country

	Kruskal–Wallis H test	<i>p</i>
Teaching Presence	66.398	.000
Social Presence	43.728	.000
Cognitive Presence	81.274	.000
Total Col	74.448	.000

Table 4
Col elements on whole sample and by countries

	Russia	Romania	Slovenia	Croatia	B&H	Serbia	Total sample
Teaching Presence	3.94	4.03	3.77	3.67	3.32	3.39	3.69
Social Presence	3.94	3.87	3.46	3.62	3.52	3.42	3.64
Cognitive Presence	3.89	3.70	3.44	3.38	3.15	3.12	3.45
Total Col	3.92	3.87	3.56	3.56	3.33	3.31	3.59

The highest values of Col elements in online teaching were noted in the subsample of Russia and Romania, then Slovenia, Croatia, and the lowest has been in Bosnia and Herzegovina and Serbia. In all countries, the Cognitive Presence has been the least represented (Table 4).

Based on the results of Col elements, the total evaluation of online teaching on the whole sample was defined as moderately developed, with the score 3.59. Teaching Presence has the highest score, followed by Social and then Cognitive Presence.

Discussion

The presented data show that there are differences in the average values of the overall assessment of the entire Col model and its individual elements in the examined countries. The highest values of the Col elements were noted in Russia (3.92) and Romania (3.87), and the lowest in Bosnia and Herzegovina (3.33) and Serbia (3.31) (Table 4).

Given the level of development of educational systems of these countries and their expenditure in education, these results should have been expected. According to Eurostat analysis in 2019, government expenditures on education in Croatia and Slovenia had been more than the European average (though Slovenia spends most of its share on primary education). Being economically weaker, less developed and regulated, Serbia and Bosnia and Herzegovina are not members of European Union. Their expenditure in education is far lower than the European average (UIS, 2019). Slovenia, the Russian Federation and Romania are the most developed countries out of the six. According to the Global Competitiveness Report for 2019 these three countries were more competitive than the rest, while Bosnia and Herzegovina and Serbia were the least competitive (Schwab, 2019). In 2015, Romania adopted a national strategy on the Digital Agenda setting out actions until 2020 in key areas that included the use of information and communication technologies (ICT) in education. Following the closure of schools, the Ministry of Education and Research organized online training for teachers and provided free access to educational platforms.

We see that the Teaching Presence is in first place, then the Social Presence, and the Cognitive Presence comes in last place. If the analysis is carried out in terms of the ratio of the elements of the Col model, then countries can be divided into three groups. The first group included Russian students for whom Teaching and Social Presence are important (3.94), the numerical values of Cognitive Presence differ to a very small extent from these two components (3.89). In other words, almost all three components in Russia are represented at approximately the same level. The second group includes countries (Romania, Slovenia, Croatia), which are characterized by a gap in numerical values between the elements of the Col model of the dominating Teaching Presence. The third group includes countries (Bosnia and Herzegovina, Serbia) in which Social Presence comes first, and the second and third places are occupied by the Teaching and Cognitive Presence. Cognitive Presence is least represented in all countries.

Mathematical analysis showed that there are statistically significant differences in Teaching, Social and Cognitive Presence between the countries included in the study (Table 3). The high values of Cognitive Presence in the responses of students from Russia coincide with the results obtained in a study (Janssen, et al. 2021) conducted in Sweden. In this study, the trend is exactly the opposite: the Cognitive Presence takes first place, then the social and the last place is occupied by the presence of the teacher. Mamuna, Lawrie and Wrighta, (2022) show the role of Cognitive Presence by highlighting student-content relationships in an online environment.

At the same time, it can be argued that the position of the teacher occupies a key position, forming the most significant space, or the most important element of the Col model – the Teaching Presence. This trend is typical for most of the countries studied in our sample. Capra (2014) showed that the teacher's participation in online learning is important for the formation of student interaction. Kupczynski et al. (2010) emphasized the importance of the presence of a teacher who provides students with knowledge on the subject, answers questions, clarifies inconsistencies and misunderstandings; is accessible to students and takes care of them (Dzubinski, 2014). Caskurlu et al. (2021) insist that the teacher's participation provides support for the direction of the discourse of joint discussion.

According to the results of our study, countries (Bosnia and Herzegovina, Serbia) were identified for which Social Presence acts as a primary element of the Col model. And this is an illustrative example, as it reveals that for students of these countries, interaction with other participants in the educational space and communication are the leading values. However, this perspective is possibly a result of the fact that in these countries, online teaching was organized to the greatest extent, and that social interaction was completely reduced to online form.

The importance of Social Presence in online education is shown in the works of many researchers. Garrison and Akyol (2013) noted that Social Presence is an element necessary for the development of cooperation, emotional relationships, emotional climate, contributing to the formation of each participant's contribution to the educational process. Studies (Belousova, Mochalova and Tushnova, 2022; Ryumshina et al., 2022) also showed that Russian students note the importance of live communication with students in the process of distance learning. In a similar survey of educational response to Covid-19 in Romania during the 2020-2021 school year, nearly all students lacked social contact, the school "atmosphere" and the social aspects of learning (Velicu, 2021). Research (Waddington and Porter, 2022) proved the necessity and importance of the formation of Social Presence, confirming the ideas (Kreijns et al.,

2014) that Social Presence contributes to the creation of a sense of reality. Currently, there is a further differentiation of the structure of Social Presence. Thus, Wertz, (2022) proposed to add the component "peer facilitation as a subscale of social presence". Janssen et al. (2021) supplemented the Col model with the emotional presence component.

However, moving from an international perspective and differences among countries to results of Col presence in total, further notions could be made. Having in mind that students' cognition and learning are the final result of online teaching, the most worrying result is that it had been scored as the lowest. Practice has shown that online teaching can result in successful learning: the students' academic success after online teaching had been equally high or even higher than in traditional teaching (Akyol and Garrison, 2011; Lee, 2021). Specifically, the online environment can have a positive effect on students' cognitive presence, as indicated by numerous studies from practice. For example, the application of the Moodle platform for learning a foreign language resulted in improved student learning (Gojkov Rajić and Šafran, 2019). Therefore, results of the current situation in examined countries is not satisfying and should be changed.

According to the theoretical basis of Community of Inquiry, effective online teaching is reflected in a successful development of a community of students and teachers that encourages meaningful and deep learning (Garrison, Anderson and Archer, 1999). Several studies over the last twenty years (Swan et al., 2009; Garrison, Cleveland-Innes and Fung, 2009; Gutiérrez-Santiuste, Rodríguez-Sabiote and Gallego-Arrufat, 2015) have proven that all three Col elements are connected: Teaching and Social Presence had a direct influence on Cognitive Presence.

Having this in mind, as well as the unsatisfying results of three Col elements, it can be concluded that it is necessary to focus primarily on increasing the Social and Teaching Presence. This would consequently lead to the increase of Cognitive Presence. Research on online teaching practices in higher education had already shown that in practice a strong Social Presence can be established in online learning communities (Swan et al., 2009), in which a sense of belonging and connection develops and strengthens students' motivation and engagement (Lee, 2021). Moreover, Janssen et al. (2021) even considered the interaction between students and teachers and students themselves (Teaching and Social Presence) to be so important that Col model should be turned into the model the Relationship of Inquiry (RoI), and that another component should be added – Emotional presence.

In fact, social (and emotional) presence is actually a result of the teachers' actions, as the teacher is a class leader and his leadership influences the class social culture directly. That is why the key of the cognitive and social development is in the increase of teacher presence. To enable this, it is essential to improve the pedagogical competencies of teachers for designing online teaching. A drastic transition from one medium to another that realizes the educational process requires "increased methodological, pedagogical and didactic competencies of teachers for which there was no need until recently" (Arsenijević, Andevski and Milin, 2012: 42). By educating teachers, they will be trained to enable more intensive social online interaction of students (collaborative aspects of learning), through which deeper understanding, meaningful learning and building meaning in the teaching process (constructivist aspects) will be achieved. It is necessary to design the teaching process so as to develop students' motivation and creativity and to suit all their learning styles. From the domain of providing access to information and knowledge, it is necessary to redirect teaching to the domain of research and co-construction of knowledge. An effective method to achieve this is joint online projects of students, within which research and experiments are performed, application of knowledge in practice and solving specific problems, with the exchange of ideas, experiences, perspectives, and prior knowledge. Examples could be writing a Wikipedia or blog page, developing applications, or construct and designing a website.

Conclusion

The paper presents the results of a study in which students from six countries participated, with the goal of reflecting the state of online teaching in higher education, that was realized during the Covid-19 virus pandemic according to the so-called Community of Inquiry model. Differences among countries have been examined as well.

When it comes to international differences, online education has been evaluated as best in Russia and Romania, followed by Slovenia and Croatia, while the lowest results had been obtained in Bosnia and Hercegovina and Serbia. Having in mind the level of development of educational systems of these countries and their expenditure in education, these results had been expected.

In this sense, because this was a convenience sampling, the size and the structure of the sample

must be addressed as a limitation of this study and the direction for future studies. Before making generalised remarks, a more sizable sample across countries needs to be provided and more equally distributed among examined countries. Having in mind the direction of the discussion regarding the level of the economic and educational development and expenditure in education, it would be advisable to provide a more diverse international sample, especially including countries with the highest expenditure on education for comparison. In this sense, differences among countries regarding their economic development and expenditure on education could be made in more detail, but other variables could be included: the level of institutional support for teachers in implementing online teaching, their technological and pedagogical training for online education as well as their experience in online education before the pandemic. The inconsistency between results in Russia from our study and the one from Sweden could therefore be checked. Also, the extent to which online education is being realised could be controlled, in order to check if Social Presence would be best ranked, as it was in Serbia and Bosnia and Herzegovina, contrary to other countries in our study.

Regardless of international differences in scores, results of Col elements in total on the whole sample was estimated as moderately high. Teaching Presence had the highest score, followed by Social Presence and Cognitive Presence. In order to achieve high quality in online education in the countries included in this survey, therefore, it is necessary to develop the attitude among its participants and stakeholders that technology can achieve goals, but not always in the same way as it had been done in the traditional teaching process. Digitalization of existing teaching processes is needed, but it is also important to design a new one that was not possible in in-person classes. Instead of the translation of the old pedagogical practices into the new online environment, there needs to be a real adaptation of teachers to the opportunities and constraints of the online environment. Teachers should be empowered to enable new ways of creating social and cognitive interaction in an online environment.

Therefore, it is necessary for faculties to prepare students for work in the online environment before the beginning of the year, by providing instructions and training for the use of platforms and tools that will be used. Furthermore, it is necessary to provide the development of teachers' pedagogical competencies for designing teaching in an online environment. Partnerships between higher education management, pedagogical and technological institutes and non-governmental organizations is needed. In addition, technical support for teachers should be provided within the capacity of the IT services on higher education institutions, in order to make the best use of the platforms and tools for online teaching and enable teachers to create meaningful technological learning environments.

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Conflict of interests

The authors declare no conflict of interest.

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