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Which Digital Tools dominate Secondary and Higher Education in Economics: Google, Microsoft or Zoom?

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Abstract

Background: Due to the Covid 19 pandemic, in many countries, higher, secondary and even primary education experienced the unannounced shift from traditional classroom lessons to distance teaching using different technologies. **Objectives:** The main objective of the research was to identify the most important digital tools applied by educators and students during the pandemic and evaluate their satisfaction with applying these tools in four countries; Croatia, Germany, Poland and Serbia. **Methods/Approach:** The questionnaires were sent via emails to educators and distributed through the classes to students using digital teaching platforms or emails. The answers were analysed by descriptive statistics. **Results:** Research showed that Google tools most commonly used by students and educators are; YouTube, Gmail, Google Translate, Google Maps and Google Drive. Microsoft digital tools most commonly used by educators and students in observed countries are; Word, PowerPoint and Excel. Other digital tools most commonly used by educators are Zoom and Moodle, while students mostly use Zoom and Kahoot. Moreover, this paper identifies the main reasons for educators' insufficient use of digital tools. **Conclusions:** Google, Microsoft and Zoom dominate their specific domains: Google for networks, Microsoft for documents, and Zoom for online meetings.

Keywords: digital tools; Google; Microsoft; Zoom; education; learning; students

Introduction

The implementation of digital tools in education at all levels of studying has become necessary in modern society (Harasim, 2012; Lau, 2014; Drijvers, 2015; Camilleri et al., 2016), especially in the context of the Covid-19 pandemic (Curcic et al., 2021; Jobirovich, 2021; Rawashdeh et al., 2021). Developing digital competencies of educators and students is an important segment of lifelong learning, both personal and professional development (Rawashdeh et al., 2021; Kallimulina et al., 2021; Bader et al., 2021). Previous research points to all the advantages and disadvantages of using information and communication technologies in education (Harasim, 2012; Lau, 2014; Drijvers, 2015; Camilleri et al., 2016; Minasyan, 2016; Cruz et al., 2017; Neufeld, 2018). There is a clear indication that maximising advantages and minimising disadvantages is directly conditioned by the high correlation between the digital competencies of educators and generating creativity and student engagement. This study analyses in more detail the level of digital competencies of educators and students and their satisfaction level with implementing digital tools in practice. This research aimed to identify the most important digital tools applied by educators and students from economic universities and faculties and educators and students from economic secondary schools during the pandemic. Moreover, the paper evaluates their satisfaction with applying different digital tools. The research sample includes educators and students from economic universities and faculties and educators and students from economic secondary schools from 4 countries; Croatia, Germany, Poland and Serbia. Four research questions were formed:

- o *RQ1 - What Google digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*
- o *RQ2 - What Microsoft digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*
- o *RQ3 - Which of the other digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*
- o *RQ4 – What are the main reasons that educators do not use enough digital tools in their lectures*

The first part of the paper analyses the previous research on this topic, after which the methodology and structure of the survey and sample are presented. By discussing the research results, conclusions on the most important digital tools for educators and students were presented.

Literature Review

The Covid-19 pandemic has affected all social, political and economic spheres, including the global education system. Digital tools have proven to be a good way to monitor and evaluate students in online teaching during the pandemic. The use of the digital tool has been the subject of research by a large number of studies over the last ten years (Harasim, 2012; Lau, 2014; Drijvers, 2015; Camilleri et al., 2016; Minasyan, 2016; Cruz et al., 2017; Neufeld, 2018), but the comparison of the advantages and disadvantages of the implementation of digital tools and online learning, compared to traditional methods, has come to the fore from the start of the Covid-19 pandemic to the present day (Garcia-Martinez et al., 2020; Kalimullina et al., 2021; Bader et al., 2021). One of the most trending topics in the field of education and many research areas are different ideas and experiences in the field of modernisation of teaching, with a focus on the use of digital technologies (Hillmayr et al., 2020; Beardsley et al., 2021, Cetin, 2021; Oliveira et al., 2021).

Harasim (2012) highlighted the benefits of developing a learning theory with a framework that considers the Internet's potential. He pointed out that continuous work should be done to find ways to innovate learning methods, and cooperation between educators and students is essential for successfully implementing any digital method of science based on the use of the potential of the Internet. Vanwynsberghe and Verdegem (2013) confirmed the conclusions made by Harasim, pointing to the potential of social networks in the exchange of learning materials and communication among students regarding all learning-related problems. Vanwynsberghe et al. (2013) emphasise the advantage of implementing social networks in educator-student communication because students are more open to this type of communication and very similar interaction can be achieved in classrooms - face to face. Drijvers (2015) dealt more detail with implementing digital technologies in education, with special reference to mathematics education. This author concluded that the design of digital tools, the role of educators in implementing teaching through digital tools and the educational context are key predictors of the success of digital technology in mathematics education.

Minasyan (2016) analysed the advantages and disadvantages of implementing digital tools in the educational process, pointing out that the 21st century should be viewed as a period of active learning and autonomy of students that takes place in parallel with the growing need to learn, develop and improve skills. Information and communication technology is the main catalyst in this process. It is the basis for the development of access to education where the focus is on students, their autonomy, and endless opportunities for continuous development and improvement in all spheres. Analysing the implementation of digital tools in education, based on examples from practice, several authors concluded that the key advantages of this approach are: technology as a teaching tool raises the level of knowledge and experience in the educator-student relationship, students are provided with quick access data, and a higher level of participation and commitment and creativity of students leads to the realisation of personal development and improvement (Danko, 2010; Makosa, 2013; Lau, 2014; Minasyan, 2016; Cruz et al., 2017; Neufeld, 2018). The negative aspects of the implementation of digital technologies in teaching were (Makosa, 2013; Minasyan, 2016; Otterborn et al., 2019): interfering with students with a large number of external factors that online educators can not follow, poor quality of activities preparing students for the realisation of online classes, cheating /copying work tasks and degradation of critical and analytical skills in the field of student thinking (debate on various topics in the classroom more effectively encourages the exchange of opinions among students, which significantly improves these skills). Cruz et al. (2017) confirmed Minasyan's conclusions, pointing to the excellent results of combining traditional and online teaching, which will generate the best results in the field of education: autonomy and independence in learning, critical thinking and solving complex problems, effective communication and exchange knowledge and experience. Camilleri et al. (2016) proved that the successful implementation of information and communication technologies and the realisation of its previously listed benefits predominantly depend on the digital literacy of students and the level of technological annexation of professors.

In the conditions of the Covid-19 pandemic, it is necessary to keep up with the times and use all the facilities offered by implementing information and communication technologies in the field of education (Gjud et al., 2020) to the fore. Many authors point out that at the very beginning of the pandemic, there was a gap between professors who considered textbooks the best way to master the material, with moderate use of digital tools, and students for whom the use of technology in

teaching creates additional interest, fun and dynamism (Vurusic, 2019; Gjud et al., 2020; Dragun, 2021). The period of temporary suspension of regular teaching processes, sampled by the pandemic, has led to a significant change in the way of learning in the education system at the global level. The epidemiological situation has imposed distance learning tools as an alternative to classroom teaching. The predominantly combined teaching system (traditional and online) was applied in the primary and secondary education systems. In contrast, higher education institutions made the most of the advantages of digital tools in education (Curcic et al., 2021). The main advantages of the implementation of distance learning tools in the field of higher education (Curcic et al., 2021; Jobirovich, 2021; Rawashdeh et al., 2021):

  o Possibility of easy access to teaching from any place that has an Internet connection;
  o Lower costs of teaching;
  o Fast and efficient exchange of teaching materials between professors-students and student-student is enabled;
  o It is possible to test students' knowledge based on precisely defined criteria by the professor;
  o Influence on the development of digital competencies of professors/students, which are very important in modern society.

Figure 1 summarizes the advantages and disadvantages of digital tools usage in education-practice.

Figure 1
Advantages and disadvantages of digital tools in education-practice
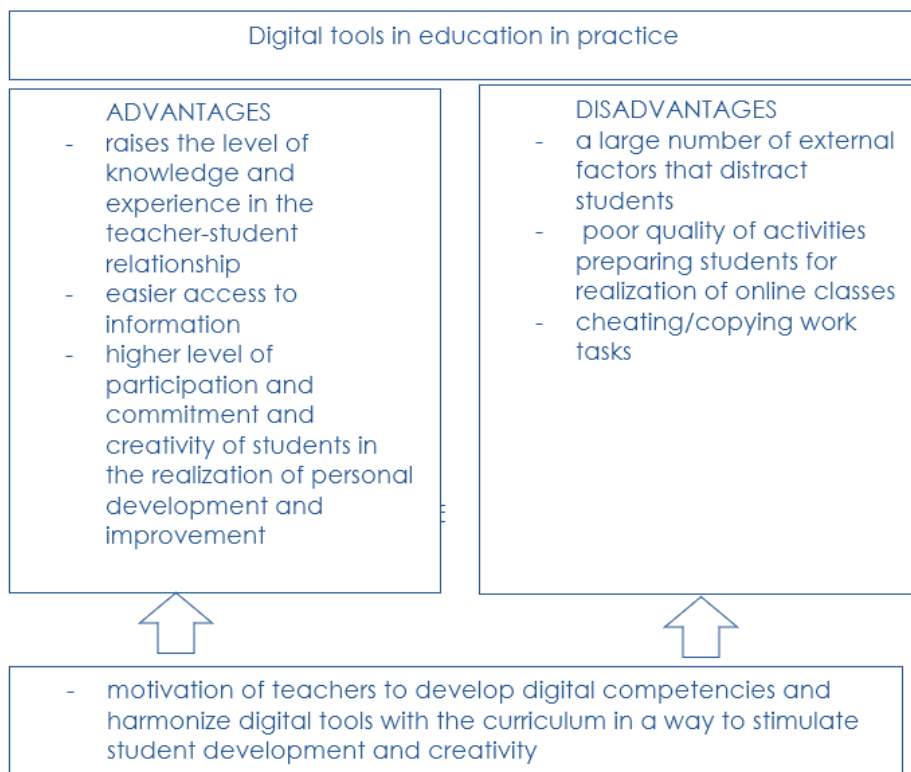
Source: Author's work, based on relevant literature

Garzia-Martines et al. (2020) researched the advantages and disadvantages of digital tools and personal education in higher education. They concluded that implementing digital tools in education is effective only if it stimulates students'

creativity, engagement and teamwork, making maximum use of Internet potential and data. Research has shown that, otherwise, students are discouraged from giving their best in using the potential of digital tools for personal and professional development. Kalimullina et al. (2021) agree with these conclusions, adding that it is very important to work intensively on the digital competence of educators because without it, there is no complete integration of digital technology in education, and thus no successful impact on students in the field of development creativity, commitment and maximum use of the potential of information and communication technologies for the development of critical thinking.

Bader et al. (2021) analysed in detail the attitudes of English students about the use of digital tools in education and concluded that it is discouraging that students are unaware of the opportunities offered by the implementation of digital tools (development of creativity, critical thinking available data and independence), but only positively assess the ease of use. This is why the question arises about the type of digital tools used in teaching these students because they should be aimed at stimulating student development in all domains. Hillmayr et al. (2020), analysing the implementation of digital tools in teaching in mathematics studies, concluded that the student positively evaluated only dynamic digital tools in teaching, which stimulate logical thinking and effective drawing of conclusions. It is very important to motivate educators to develop their digital competencies because it will generate their improvement in the application of digital tools in education in a way that corresponds to the curriculum, with a focus on stimulating the creativity and engagement of students (Beardsley et al., 2021; Cetin, 2021). Digital skills and educator competencies are the basis of the digital transformation of education (Guillen-Gamez et al., 2021; Hamalainen et al., 2021; Oliveira et al., 2021; Yilmaz, 2021; Zhao et al., 2021).

It can be concluded that implementing digital tools is necessary for the era of rapid development of information and communication technologies, but that their potential is not maximised, either by professors or students. The fact is that the use of digital tools in teaching has both positive and negative sides, with undeniable potential that can be used only through teamwork in the educator-student relationship, with the motivation of educators to develop digital competencies and motivate students to improve in all domains, a key predictor of the efficiency and effectiveness of this teamwork, and thus the success of the digital transformation of education. Creating digital tools for the educational sphere in the years to come should stimulate lifelong learning for students and educators.

Methodology

Sample characteristics

This paper is the result of the cooperation of educators from Croatia, Poland, Serbia, and Germany who have been involved in the DIGI4Teach project. Therefore, the research was conducted in these countries. Respondents from the following institutions were included in the research; the University of Zagreb – Faculty of Economics and Business, Osnabrück University of Applied Sciences, Cracow University of Economics, University of Belgrade – Faculty of Economics,1st, 2nd and 3rd School of Economics from Zagreb, and School of Economics, Trade and Hospitality from Samobor, Croatia, but also other universities, faculties and economic secondary schools from those four countries were included. The data was collected from November 2021 until January 2022 for students and from December 2021 until January 2022 for educators. The questionnaires were sent via emails to educators and

distributed through the classes to students using digital teaching platforms or emails. The results presented in this paper are part of wider research structured as part of the DIGI4Teach project. In other words, the questionnaire sent to educators and students contains more questions than those analysed in this paper.

The research sample includes educators and students from economic universities and faculties and educators and students from economic secondary schools. Empirical research was conducted on two groups of respondents, professors and students. The sample related to professors includes professors from secondary schools of economics and university professors. The sample related to students includes students from secondary schools of economics and university students. In this research, 423 educators, of which 77.54% were university educators and 22.46% were educators of secondary schools of economics (table 1). The survey includes answers from 2,474 students, most of whom come from universities, 67.87%, while the remaining students come from secondary schools of economics (table 1).

Table 1
Educational level – educators and *students*

Educational level	# of educators	% educators	# of students	% students
Faculty (university)	328	77.54%	1,679	67.87%
Secondary school of economics	95	22.46%	795	32.13%
Total	423	100.00%	2,474	100.00%

Source: Author's work

This study's respondents come from Croatia, Germany, Poland and Serbia. The largest number of educator respondents comes from Croatia (40,90%), followed by Poland (32.39%), Serbia (23.17%) and Germany (3.55%). The situation is similar with student respondents, most of whom are from Croatia, followed by Poland, Serbia and Germany. The structure of respondents by country is shown in table 2.

Table 2
Country where educator's and student's school/faculty/university is located

Country	# of educators	% educators	# of students	% students
Croatia	173	40.90%	1,298	52.47%
Germany	15	3.55%	45	1.82%
Poland	137	32.39%	699	28.25%
Serbia	98	23.17%	432	17.46%
Total	423	100.00%	2,474	100.00%

Source: Author's work

According to the number of years of teaching, most educators are engaged in lectures between 16 and 25 years old (34.04%), which indicates a high level of respondents' experience in the teaching process. Slightly fewer respondents teach between 6 and 15 years (31.68%), followed by respondents with more than 25 years of teaching experience (18.68%), while the smallest number of respondents have less than 5 years of teaching experience (15.60%).

Among students, the largest number of students at the time of the survey was in the third year of study (30.19%), followed by students in the second year of study (25.75%), the first year of study (21.62%), the fourth year of study (17.18%) and fifth years of study (5.25%).

The largest number of educators cite trade (23.17%) as their main area of interest, followed by accounting (19.39%), finance (19.39%) and tourism (11.82%). According to the area of interest, the remaining respondents were classified in the category other (26.24%). The structure of educators and students according to the main interest area is presented in table 3. The main area of interest for the largest number of students is finance (25.34%), followed by trade (21.06%), accounting (19.77%) and tourism (15.44%). Other areas of interest include the same areas for educators and are related to 18,39% of students. Among them, management (5.94%) and marketing (5.50%) are the most important areas of interest.

Table 3
Structure of educators and students according to the main interest area

Major	# of educators	% educators	# of students	% students
Accounting	82	19.39%	489	19.77%
Finance	82	19.39%	627	25.34%
Tourism	50	11.82%	382	15.44%
Trade	98	23.16%	521	21.06%
Other	111	26.24%	455	18.39%
Total	423	100.00%	2,474	100.00%

Source: Author's work

Research questions

In this research, four research questions were defined. Two groups of respondents answered the first three research questions; educators and students using a Likert scale of 1-5 (possible answers are: 0 - I do not use; 1 - I am extremely dissatisfied; 5 - I am extremely satisfied):

- o "What Google digital tools do you use in your education and learning, and how satisfied are you with them?" (RQ1)
- o "What Microsoft digital tools do you use in your education and learning, and how satisfied are you with them?" (RQ2)
- o "Which of the other digital tools do you use in your education and learning in general, and how satisfied are you with them?" (RQ3)

The answers to these questions were analysed by applying descriptive statistics where average values were calculated for each answer of the respondents. The fourth research question is as follows:

- o "If you think that you do not use enough digital tools in your lectures, please select the main reason/s for this" (RQ4)

Six answers were offered to this question, and the respondents were able to mark several answers. Respondents were also allowed to state other reasons in an open form.

Results

Google tools

Table 4 shows the percentage of respondents who do not use a particular Google digital tool and the mean value of educators' and students' satisfaction.

According to research results, the first five Google tools used by most educators in education are YouTube (91.49%), Gmail (90.31%), Google Translate (85.58%), Google Maps (84.63%) and Google Drive (78.49%). Similar research results are found for students. Most students use YouTube (96.28%), Gmail (95.55%), Google Translate (93.09%), Google Maps (88.32%) and Google Drive (73.52%). It can be concluded that

Google tools most commonly used by students and educators are; YouTube, Gmail, Google Translate, Google Maps and Google Drive. Those digital tools are used by more than 70% of educators and students. In addition to the Google mentioned above tools, more than 60% of educators use Google Docs, Google Forms, and Google Sites in the teaching process. In addition to the most commonly used Google digital tools mentioned above, more than 60% of students use Google Classroom, Google Docs and Google Meet in their education.

Educators expressed the greatest satisfaction with using Google Maps, for which the average grade is 4.29, Gmail with an average grade of 4.19 and Google Drive and Google Calendar, with an average grade of 4.01. On the other hand, students expressed their greatest satisfaction with using YouTube, which has an average grade of 4.28; Gmail, with an average grade of 4.27; and Google Maps, with an average grade of 4.24.

Table 4
Mean values of educators 'and students' answers about the application of Google digital tools in education and learning

Google Tools	Educators (Average)	Educators (% not using the tool)	Students (Average)	Students (% not using the tool)
YouTube	3.99	8.51%	4.28	3.72%
Gmail	4.19	9.69%	4.27	4.45%
Google Maps	4.29	15.37%	4.24	11.68%
Google Translate	3.87	14.42%	3.81	6.91%
Google Drive	4.01	21.51%	3.82	26.48%
Google Classroom	3.90	53.90%	3.92	34.92%
Google Docs	3.73	35.22%	3.71	32.58%
Google Meet	3.67	46.81%	3.75	39.37%
Google Forms	3.88	37.59%	3.67	45.35%
Google Calendar	4.01	41.84%	3.61	55.09%
Google Earth	3.68	55.79%	3.60	59.14%
Google Sheets	3.81	56.03%	3.49	60.99%
Google Sites	3.59	37.59%	3.43	62.69%
Google Slides	3.46	69.03%	3.44	63.62%
Google Contacts	3.83	52.25%	3.36	68.31%
Google News	3.16	73.52%	3.25	68.15%
Google Ads	3.15	75.65%	2.77	65.56%
Google Cloud Search	3.49	75.41%	3.21	70.86%
Google Chat	3.42	74.23%	3.27	72.55%
Google Groups	3.30	74.47%	3.21	74.09%
Google Hangouts	3.19	78.49%	3.04	74.05%
Google Travel	3.35	79.67%	3.20	77.24%
Google Print	3.17	84.63%	3.15	76.80%
Google Jamboard	3.32	85.11%	3.06	78.05%
Google Keep	3.30	85.82%	3.12	78.74%
Google Vault	2.94	87.71%	3.04	79.26%
Google Podcasts	3.14	85.11%	3.04	79.63%
Google Currents	2.97	89.13%	3.02	79.30%
Google Collections	3.26	88.42%	2.93	80.36%

Note: Possible answers are: 0 - I do not use; 1 - I am extremely dissatisfied; 5 - I am extremely satisfied
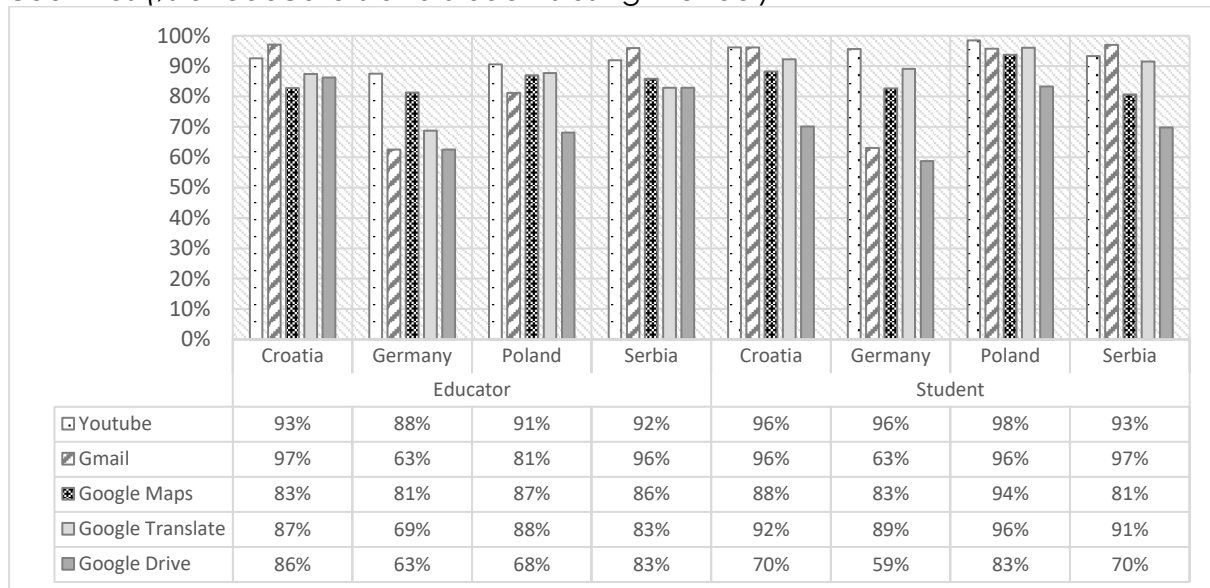*Source: Author's work*

Figure 2 shows the most commonly used Google digital tools by educators and students in Croatia, Germany, Poland and Serbia, where the respondents come from. In Croatia and Serbia, Google digital tool most commonly used by educators is Gmail, while in Germany and Poland, the most used Google digital tool is YouTube.

Figure 2
The most common Google digital tools used by educators and students in observed
countries (% of educators and students using the tool)

	Educator				Student			
	Croatia	Germany	Poland	Serbia	Croatia	Germany	Poland	Serbia
▢ Youtube	93%	88%	91%	92%	96%	96%	98%	93%
▨ Gmail	97%	63%	81%	96%	96%	63%	96%	97%
▩ Google Maps	83%	81%	87%	86%	88%	83%	94%	81%
▢ Google Translate	87%	69%	88%	83%	92%	89%	96%	91%
▪ Google Drive	86%	63%	68%	83%	70%	59%	83%	70%

Source: Author's work

Microsoft tools

Table 5 shows the percentage of respondents who do not use a particular Microsoft digital tool in education and learning.

Table 5
Mean values of educators 'and students' answers about the application of Microsoft digital tools in education and learning

Microsoft tools	Educators (Average)	Educators (% not using the tool)	Students (Average)	Students (% not using the tool)
Word	4.55	1.18%	4.42	1.33%
PowerPoint	4.54	1.18%	4.39	1.78%
Excel	4.44	3.31%	4.21	5.78%
Teams	3.69	31.91%	3.66	42.04%
Outlook	4.04	35.46%	3.66	59.50%
OneNote	3.46	67.85%	3.40	66.65%
MS Forms	3.59	67.85%	3.40	68.63%
Movie Maker	3.06	83.69%	3.07	73.24%
Publisher	3.09	82.51%	3.12	78.78%
Flipgrid	2.72	91.49%	2.91	83.23%

Note: Possible answers are: 0 - I do not use; 1 - I am extremely dissatisfied; 5 - I am extremely satisfied
Source: Author's work

The research results show that more than 95% of educators and 94% of students use Word, PowerPoint and Excel in education and learning.
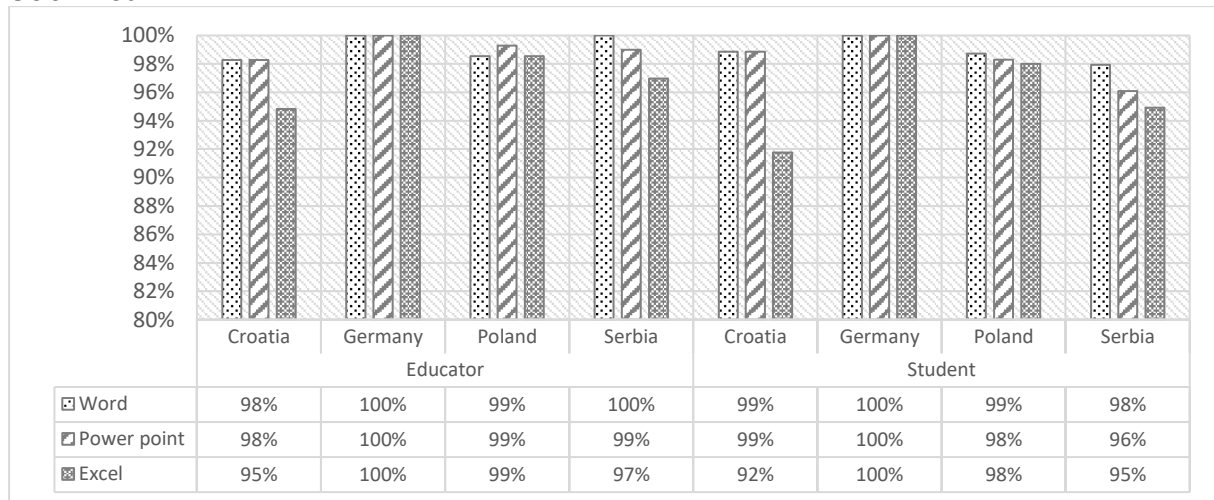
More than 60% of educators in education use the Microsoft digital tools Teams (68.09%) and Outlook (64.54%). Students use these tools to a lesser extent; Teams (57.98%) and Outlook (40.50%). Educators express the greatest satisfaction with the use of Word (average grade 4.55), PowerPoint (average grade 4.54), Excel (average grade 4.44) and Outlook (average grade 4.04). Students show a slightly lower level of

satisfaction with the use of these digital tools; however, those tools still have high average grades; Word (4.42), PowerPoint (4.39) and Teams (4.21).

Figure 3 shows the most common Microsoft digital tools educators and students use in observed countries. In all observed countries, more than 98% of educators use Word and PowerPoint and more than 94% use Excel in education. Moreover, in all observed countries, more than 98% of students use Word, more than 96% of students use PowerPoint, and more than 91% of students use Excel in learning.

According to the research results, it is evident that educators and students in Croatia use Excel to a lesser extent in education and learning than in other countries.
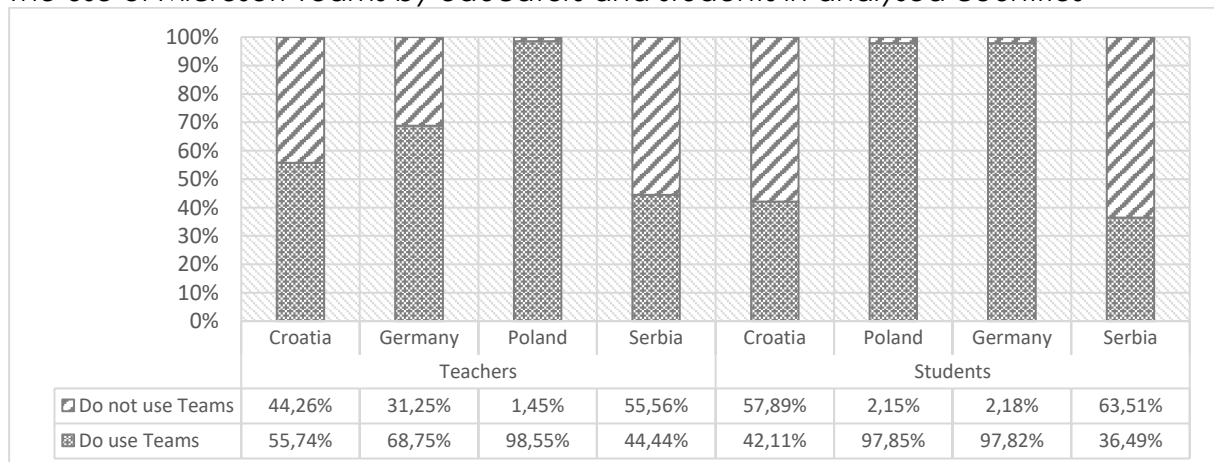
Figure 3
The most common Microsoft digital tools used by educators and students in observed countries

	Croatia	Germany	Poland	Serbia	Croatia	Germany	Poland	Serbia
	Educator				Student			
Word	98%	100%	99%	100%	99%	100%	99%	98%
Power point	98%	100%	99%	99%	99%	100%	98%	96%
Excel	95%	100%	99%	97%	92%	100%	98%	95%

Source: Author's work

Table 5 identified a difference in the use of Teams between educators (68.09% of educators use the tool) and students (57.96% use the tool). Because this digital tool was very important in online teaching, the use of this Microsoft digital tool by country was analysed below in Figure 4.

Figure 4
The use of Microsoft Teams by educators and students in analysed countries

	Croatia	Germany	Poland	Serbia	Croatia	Poland	Germany	Serbia
	Teachers				Students			
Do not use Teams	44,26%	31,25%	1,45%	55,56%	57,89%	2,15%	2,18%	63,51%
Do use Teams	55,74%	68,75%	98,55%	44,44%	42,11%	97,85%	97,82%	36,49%

Source: Author's work

Other Tools

The goal of the third research question, "Which of the other digital tools do you use in your education and learning in general and how satisfied are you with them?" was to identify other digital tools used in the education process (Table 6).
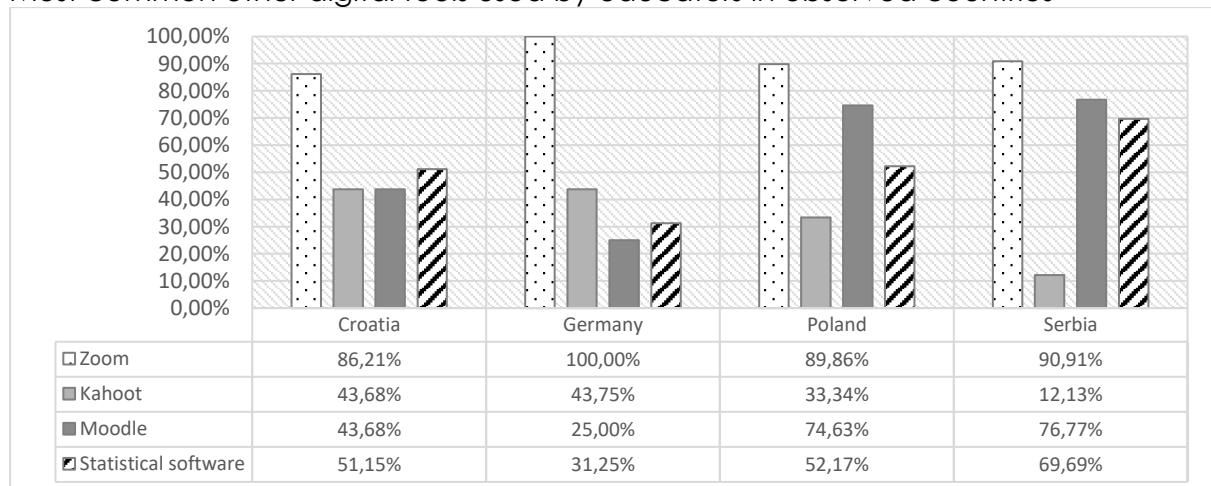
Table 6
Mean values of educators 'and students' answers about the application of the other digital tools they use in your education and learning

Other tools	Educators (Average)	Educators (% not using the tool)	Students (Average)	Students (% not using the tool)
Zoom	4.33	11.11%	3.95	25.26%
Kahoot	3.73	63.59%	4.04	28.66%
Canva	3.74	76.36%	3.81	57.15%
Worldwall	3.66	84.87%	3.33	73.16%
Mentimeter	3.57	81.80%	3.21	82.13%
Geogebra	3.14	90.07%	3.32	77.93%
Bookwidgets	3.03	93.14%	2.93	87.67%
Genially	3.08	91.25%	3.03	87.19%
Merlin	3.54	83.69%	3.14	77.77%
Quizizz	3.65	79.91%	3.51	66.09%
Mindmapping	3.27	86.76%	3.06	83.19%
Wizer.me	3.09	92.43%	2.93	85.89%
ClickMeeting	3.07	80.38%	2.99	82.22%
WordPress	3,32	79.20%	3.24	78.50%
Inforgapia	2,69	93.85%	2.95	87.71%
Book Creator	3,07	92.91%	2.94	86.70%
Yammer	3,52	83.69%	3.33	77.61%
Lumen	3,12	83.92%	3.08	79.30%
QR code generation software	3,60	76.60%	3.23	80.40%
Moodle	3,74	41.61%	3.67	56.51%
Lucidpress	2,81	93.85%	2.93	87.95%
Powtoon	2,94	91.96%	3.02	87.23%
Lucidchart Diagrams	3,00	92.20%	3.06	86.62%
Statistical software	3,79	45.39%	3.15	79.14%
Diagrams.net	3,22	93.62%	3.02	87.31%
Accounting software	3,36	81.56%	3.04	80.36%
Piktochart	3,09	91.96%	3.03	85.77%

Note: Possible answers are: 0 - I do not use; 1 - I am extremely dissatisfied; 5 - I am extremely satisfied; Source: Author's work
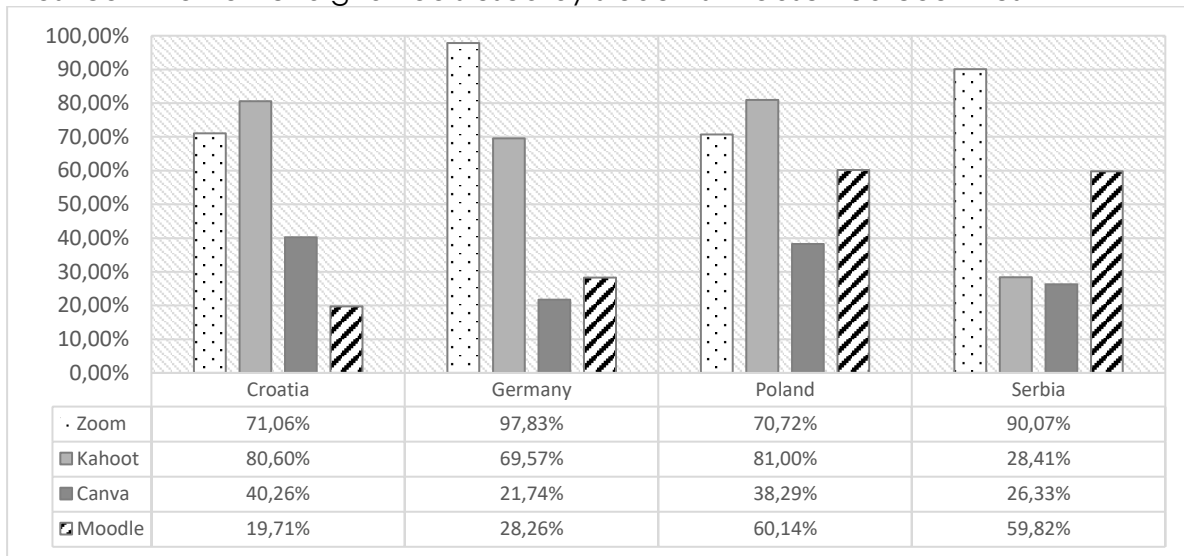
Figure 5
Most common other digital tools used by educators in observed countries

	Croatia	Germany	Poland	Serbia
Zoom	86,21%	100,00%	89,86%	90,91%
Kahoot	43,68%	43,75%	33,34%	12,13%
Moodle	43,68%	25,00%	74,63%	76,77%
Statistical software	51,15%	31,25%	52,17%	69,69%

Source: Author's work

Figure 6
Most common other digital tools used by students in observed countries

	Croatia	Germany	Poland	Serbia
· Zoom	71,06%	97,83%	70,72%	90,07%
▪ Kahoot	80,60%	69,57%	81,00%	28,41%
▪ Canva	40,26%	21,74%	38,29%	26,33%
▨ Moodle	19,71%	28,26%	60,14%	59,82%

Source: Author's work

Reasons for not using enough digital tools

The last research question was asked only to educators; " If you think that you do not use enough digital tools in your lectures, please select the main reason/s for this". Educators were able to mark multiple answers. As can be seen in Table 7, most respondents cite the main reason for insufficient use of digital tools in lectures; (1) Overload of existing teaching materials (lack of time for additional application of digital tools) – 48% and (2) Lack of time for preparing new materials (47%). Lack of financial resources seems to be the least significant reason for the insufficient use of digital tools (11%).

Respondents had the opportunity to state other reasons for the insufficient use of digital tools and stated some of the reasons; (1) lack of support from specialists to implement new digital tools, (2) some tools are similar to others, so it makes no sense to use them all, (3) tools should match the content of the course and learning outcomes, (4) it is not an obligatory action at university, (5) data protection regulations, (6) data privacy etc.
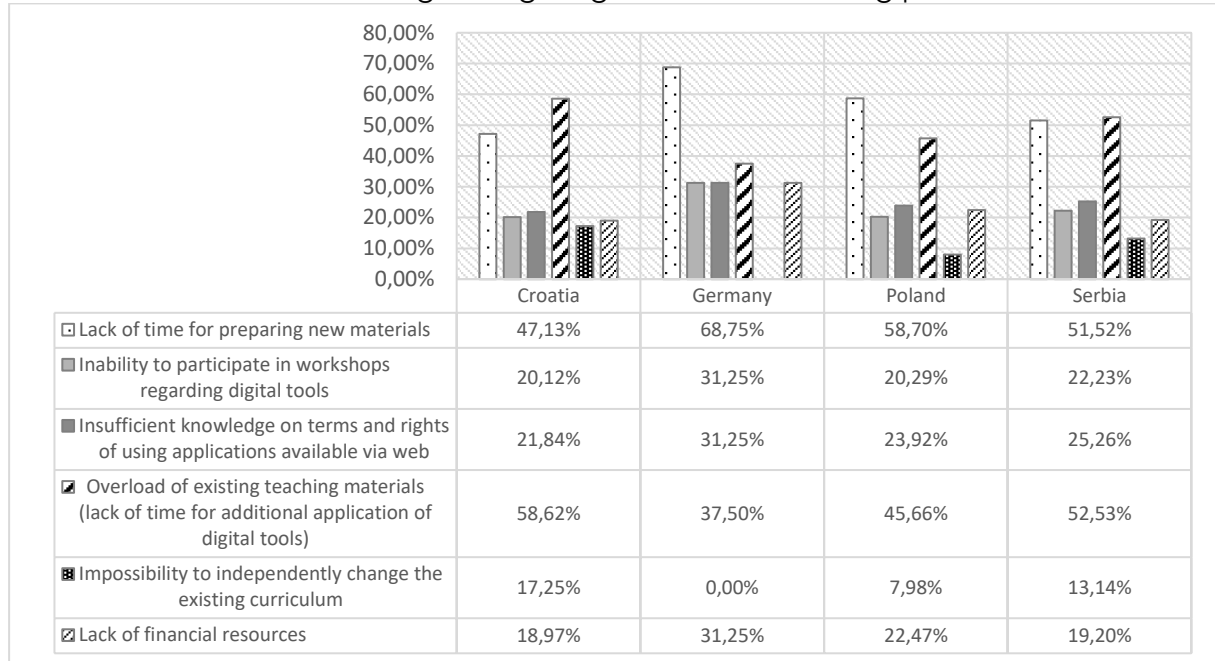
Table 7
Reasons for not using enough digital tools in teaching practice

If you think that you do not use enough digital tools in your lectures, please select the main reason/s for this	# educators	% educators
Lack of time for preparing new materials	200	47.29%
Inability to participate in workshops regarding digital tools	84	19.86%
Insufficient knowledge of terms and rights of using applications available via web	72	17.03%
Overload of existing teaching materials (lack of time for additional application of digital tools)	203	47.99%
Impossibility of independently changing the existing curriculum	77	18.21%
Lack of financial resources	47	11.12%

Source: Author's work

Figure 7
The main reasons for not using enough digital tools in teaching practice

	Croatia	Germany	Poland	Serbia
☐ Lack of time for preparing new materials	47,13%	68,75%	58,70%	51,52%
▨ Inability to participate in workshops regarding digital tools	20,12%	31,25%	20,29%	22,23%
▧ Insufficient knowledge on terms and rights of using applications available via web	21,84%	31,25%	23,92%	25,26%
▨ Overload of existing teaching materials (lack of time for additional application of digital tools)	58,62%	37,50%	45,66%	52,53%
▦ Impossibility to independently change the existing curriculum	17,25%	0,00%	7,98%	13,14%
▨ Lack of financial resources	18,97%	31,25%	22,47%	19,20%

Source: Author's work

Figure 7 shows the main reasons for not using enough digital tools in teaching practice by country. The main reason is the overload of existing teaching materials (lack of time for additional application of digital tools) in Croatia and Serbia, followed by a lack of time for preparing new materials. In Germany and Poland, the main reason is the lack of time for preparing new materials, followed by the overload of existing teaching materials (lack of time for additional digital tools).

Discussion

Until the Corona crisis, teaching at higher education institutions was held almost exclusively in classrooms. A small number of courses were held as online courses. High education lately experienced the unannounced shift from traditional lessons held in classrooms to distance teaching using different technologies. Due to those specific circumstances, educators are forced to change how they observe the process of learning, teaching and assessment in the digital environment. On the other hand, students also had to adapt to a new way of learning, applying new digital technologies in a short period. According to Toquero (2020), there is a stronger need for academic organisations to improve their curriculum, and the usage of new instructional methods and strategies should be of utmost significance. According to Toquero (2020), in the future, we can expect changes in the curriculum of courses at different universities globally and the introduction of a hybrid way of teaching permanently; a mix of traditional teaching in classrooms at universities and online teaching using different digital technologies. This research aimed to identify which digital tools educators and students use the most in teaching and learning and to what extent they are satisfied with them. To achieve the goal of the research, four research questions were asked to educators and students; (RQ1) "What Google digital tools do you use in your education and learning in general and how satisfied are you with them?", (RQ2) "What Microsoft digital tools do you use in your education and learning in general, and how satisfied are you with them?", (RQ3) "Which of the

other digital tools do you use in your education and learning in general, and how satisfied are you with them?" and the fourth research question (RQ4) was asked only to educators and was: "If you think that you do not use enough digital tools in your lectures, please select the main reason/s for this". Six answers were offered to this question, and the respondents were able to mark several statements. Respondents were also allowed to state other reasons in an open form. The survey included respondents from 4 countries; Croatia, Germany, Poland and Serbia. A total of 423 educators and 2,474 students answered the research questions. The limitation of this research can be identified in the relatively small share of respondents from Germany. Therefore, research on a larger sample of educators and students should be further examined to obtain more relevant conclusions on the application of digital technologies in Germany.

Answers to research questions of this research are presented below:

o *RQ1 - What Google digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*

According to research results, the first five Google tools used by most educators in education are YouTube (91.49%), Gmail (90.31%), Google Translate (85.58%), Google Maps (84.63%) and Google Drive (78.49%). Similar research results are found among students. Most students use YouTube (96.28%), Gmail (95.55%), Google Translate (93.09%), Google Maps (88.32%) and Google Drive (73.52%). It can be concluded that Google tools most commonly used by students and educators are; YouTube, Gmail, Google Translate, Google Maps and Google Drive. Those digital tools are used by more than 70% of educators and students. Educators expressed the greatest satisfaction with using Google Maps, for which the average grade is 4.29, Gmail with an average grade of 4.19 and Google Drive and Google Calendar, with an average grade of 4.01. On the other hand, students expressed their greatest satisfaction with using YouTube, which has an average rating of 4.28; Gmail, with an average rating of 4.27; and Google Maps, with an average rating of 4.24.

o *RQ2 - What Microsoft digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*

The research results show that more than 95% of educators and 94% of students use Word, PowerPoint and Excel in education and learning. Educators express the greatest satisfaction with the use of Word (average grade 4.55), PowerPoint (average grade 4.54), Excel (average grade 4.44) and Outlook (average grade 4.04). Students show a slightly lower level of satisfaction with the use of these digital tools; however, those tools still have high average grades; Word (4.42), PowerPoint (4.39) and Teams (4.21).

o *RQ3 - Which of the other digital tools do students and educators use in their education and learning in general, and how are they satisfied with them*

The research results showed that among other digital tools that educators use in teaching, Zoom is the most important, and 89% of educators apply it; Moodle is used by 58% of educators, Statistical software by 55% of educators and Kahoot by 36% of educators. Students, on the other hand, mostly use Zoom (74%), Kahoot (71%), Moodle (43%) and Canva (43%). In this category, educators rated the digital tool Zoom with the highest average grade (4.33), while students expressed the highest satisfaction with Kahoot (4.04).

o *RQ4 – What are the main reasons that educators do not use enough digital tools in their lectures*

Educators were able to mark multiple answers. Most respondents cite the main reason for insufficient use of digital tools in lectures site; (1) Overload of existing teaching materials (lack of time for additional application of digital tools) – 48% and

(2) Lack of time for preparing new materials (47%). Other important reasons are; Inability to participate in workshops regarding digital tools (20%), the Impossibility of independently changing the existing curriculum (18%), and Insufficient knowledge of terms and rights of using applications available via the web (17%). Lack of financial resources seems to be the least significant reason for the insufficient use of digital tools (11%).

Conclusion

Research papers published before the Covid-19 health crises showed how these crises accelerated the digital transformation in higher education. Digital transformation changes how educational material is published and distributed to learners. Moreover, digital technologies are also changing the nature of lectures. Digital transformation in higher education is inevitable. The unannounced need for accelerated digital transformation in higher education will have permanent consequences in teaching. A complete return to the classic way of teaching seems not to be expected. Covid-19 strongly influences all aspects of our lives and, thus, higher education institutions. Transfer to online learning was one of the most significant changes in delivering lectures in 2020-2021. Transferring from traditional learning to online learning happened quickly and unexpectedly.

The main objective of this research was to identify key digital tools used by educators and students and their satisfaction with them in four countries; Croatia, Germany, Poland and Serbia. The research sample includes educators and students from economic universities and faculties and educators and students from economic secondary schools. A total of 423 responses from educators and 2,474 responses from students from the 4 countries were collected. Most of the surveyed educators and students come from Croatia, followed by Poland and Serbia, while the least is from Germany, a kind of research limitation. To get a more accurate picture of the application of digital technologies in Germany, it is necessary to expand the research to a larger number of respondents. According to the years of work experience, the largest number of educators (respondents) have between 16 and 25 years of experience in teaching, followed by educators with between 6 and 15 years of experience. The largest number of students is in the third year of study, followed by students in the second year of study.

Regarding Google digital tools, research results showed that Google tools most commonly used by both students and educators are; YouTube, Gmail, Google Translate, Google Maps and Google Drive. Moreover, educators expressed the greatest satisfaction with the use of Google Maps (average grade 4,29), Gmail (4,19) and Google Drive and Google Calendar (4.01). On the other hand, students expressed their greatest satisfaction with the use of YouTube (4,28), Gmail (4.27), and Google Maps (4.24). Regarding Microsoft digital tools, research results showed that the Microsoft tools most commonly used by educators and students in observed countries are; Word, PowerPoint and Excel. Educators and students rated their satisfaction with using these digital tools with high average grades. The research results showed that among other digital tools that educators use in teaching, Zoom and Moodle are the most important, followed by Statistical software and Kahoot.

On the other hand, students mostly use Zoom, Kahoot, Moodle and Canva. In this category, educators rated the digital tool Zoom with the highest average grade (4.33), while students expressed the highest satisfaction with Kahoot (4.04). The paper also analyses the application of the most important Google, Microsoft and other digital tools by country. The aim of the research was also to identify the main reasons for the insufficient use of digital tools by educators, and two main reasons were

identified; (1) Overload of existing teaching materials (lack of time for additional application of digital tools) and (2) Lack of time for preparing new materials. For future research, we recommend including educators and students from other countries in the sample to identify the most important digital tools for educators and students in transitional and economically developed countries.

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