

Application of New Software Tools in Online Teaching

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Abstract: *This study examined students' attitudes about general issues related to the application of software tools in online teaching, as well as about their advantages and disadvantages. The study included 110 students of the Faculty of Technical Sciences in Čačak. The questionnaire specifically designed for this research was used for the survey. It was found that the students are well informed on software tools, that a large percentage of students use it and that the software tools has more advantages for learning than disadvantage. In this paper, the application is analyzed of the most current new software tools is analyzed. Based on the results of the research, conclusions were made regarding the improvement of e-teaching.*

Keywords: *software tools; online teaching; e-learning*

1. INTRODUCTION

Online teaching is the presentation of the educational process using information and communication technologies (ICT). This an educational process is distance learning in which the teacher and students are not physically in the same place, such as distance learning via a videoconferencing system that is transmitted to remote locations or through an online course developed in a distance education tool.

E-education can also be enriching classroom teaching, such as visualization of a topic with the help of a projector and a computer. By applying new software tools e-education encompasses a wide range of educational activities, where, in addition to the issue of infrastructure, it especially refers to the way of communication, cooperation, interactivity, the quality of teaching content, services, practices, etc.

E-learning, therefore, means using electronic applications in the learning process (computer training, web-based training, virtual classrooms, digital collaboration).

The term „e-learning” appeared recently in our country, but it quickly began to be used, gradually replacing such a concept as „distance learning”.

The approach to modern e-learning is closely related to the "generation theory" [1], according to which each generation has its own typology of behavior related to information technology in general and e-learning in particular. Four generations are distinguished:

- The generation of 1945-1964 („Baby boomers” - the generation of births after the war) began to use information technology in adulthood,

which led to an increase in the period of education, painful adaptation and resistance;

- Generation „X” 1965-1979 („Generation of digital adaptation”). This generation began using information technology in their teens, usually using computer games;
- Generation „Y” 1980-2000 („Born in digital”). The generation is well acquainted with digital technologies, immersion in the digital environment is a natural process, learning and adapting are intuitive;
- Generation „V” 2000 - ... („Embodied in digital”). This generation has been known for information technology and modern devices since birth.

So, generation Y and V are the main consumers of e-learning today. For them, the traditional form of education is not effective.

Hybrid teaching is a combination of online and classical teaching and it is an ideal case for educating students in the 21st century. Such classes can have different variations in use during the school year.

Online teaching can be considered as any educational (study) program that uses ICT in order to realize teaching/learning. Recently, e-education is considered to be a wide range of educational activities, with less consideration of the issue of infrastructure and much more ways of communication, cooperation, interactivity, quality of teaching content, services, practice and as describe in paper [2]. The results of the research conducted by the students of the Faculty of Technical Sciences in Čačak will be used to improve the teaching of online by using software tools.

2. POSSIBILITIES OF CHOICE OF APPLICATION OF NEW SOFTWARE TOOLS

Today, there are many software tools that are used in online teaching. The characteristics of significant software tools will be presented in section 2.1, and the new software tools applied in online teaching in 2020 will be presented in section 2.2.

2.1. Characteristics and significance of current software tools

Various online and offline tools can be of great benefit for better distance learning. There are a number of available software tools. Here are briefly described most popular:

Nearpod - *Creation, interaction and evaluation using mobile devices* (<https://nearpod.com/>)

It is difficult for a teacher to create interesting lessons every time that will attract the attention of all students. It is even more difficult to create lessons that promote learning through interactivity. Nearpod offers a variety of fully interactive classes designed by experts for all school levels and subjects. Also, Nearpod allows teachers to import lessons from any type of file and start adding interactive elements, web links or video clips.

Kahoot! - *Creating educational games* (<https://kahoot.com/>)

Kahoot! allows teachers to quickly create fun learning games with multiple choices. After creating the game, students can use any device to enter the "room" of the game using a unique code to complete tasks and compete with peers.

Buncee - *Create, present and share multimedia lessons* (<https://app.edu.buncee.com/>)

Buncee is a presentation tool that encourages critical thinking, communication skills, collaboration and creativity. Some of Buncee's many features include over 10,000 graphics to make learning more fun. In Buncee, there is the possibility of recording audio and video, as well as integration with YouTube, Pikabai and many other resources.

Remind - *Facilitates communication in education* (<https://www.remind.com/>)

It is a classroom messaging application that helps teachers, students and parents communicate quickly and efficiently. By merging school communities, Remind makes things easier for everyone. Contacts can communicate directly with each other, schedule reminders, view attachments.

Matific - *Math games for kids* (<https://www.matific.com/us/en-us/home/>)

Matific provides a library of amazing math resources for children ages 4-11. Knowledge is delivered in the form of exciting interactive applications designed for mobile phones and tablets.

ThingLink - *Annotation of images and videos* (<https://www.thinglink.com/>)

ThingLink allows you to use over 70 different types of content such as links, videos, maps, images, social media and more. It allows users to create interactive content in just three steps and use the built-in sharing link, to easily distribute content to students wherever they are and on any device they use.

Book Creator - *An easy way to create beautiful e-books* (<https://bookcreator.com/>)

Book Creator is a simple application for creating e-books. Teachers are enabled to develop interactive and educational learning resources that students can easily share and use. Electronic resources are very easy to update.

Explain Everything - *Team work on an interactive online board* (<https://explaineverything.com/>)

Explain Everything is simple in design and helps to create an interactive whiteboard for team work in real time, using animation, sound and comments.

Quizizz - *Fun quiz* (<https://quizizz.com/signup/occupation>)

Quizizz allows you to find quizzes by other teachers, create your own quizzes and share them with the world. Quizizz is available on all devices, students can participate together, but each at his own pace. There is a possibility to analyze detailed reports in order for the quiz creator to understand where the students need help.

EducationCity - *Educational games for children and resources for teachers* (<https://www.edmentuminternational.com/>)

EducationCity is one of the leading online educational resources. It was created in 1999 and now has users in over 70 countries around the world. It is ideal for children from 3 to 12 years. EducationCity's interactive educational resources cover English, French and Spanish, mathematics, natural sciences and computer science. It offers different types of content, and is suitable for both group and individual learning.

Padlet - *The easiest way to organize a collaboration* (<https://padlet.com/dashboard>)

The Padlet is like a white sheet on the screen. Anything is placed on a blank page, then a video is loaded, a conversation is recorded, text is added or a document is transmitted - the page comes to life. The page can be visited and updated in real time by the users you have invited.

Microduino - *Do-it-yourself electronics for all ages* (<https://microduinoinc.com/>)

Microduino designs and manufactures digital blocks that can be connected to a wide range of digital input and digital/analog output devices, enabling

children to be taught engineering and coding. Microduino is a multi-part package that allows users to create, animate and control the objects they create.

TouchCast - *Smart video creation*
(<https://www.touchcast.com/>)

At the heart of TouchCast is smart video, allowing you to use streaming video tools that are incredibly easy to use. Interactive elements can be used to make videos more attractive, and there is also the possibility of collaboration from anywhere in the world.

TinyTap - *Create games and learn from others*
(<https://www.tinytap.it/>)

TinyTap is a playground for interactive educational games, allowing you to create interactive presentations, detailed study guides and quizzes using tools that are easy to use.

EDPuzzle - *Add more videos to the lesson*
(<https://edpuzzle.com/>)

EDPuzzle allows teachers to easily customize videos by adding questions and sound to create more interesting video tutorials. Helping to overcome the classic problem of students sleeping during long videos, EDPuzzle allows you to add breaks during the video. At the end of each video segment, pauses can be added to.

Tinybop - *Games of the future*
(<https://tinybop.com/>)

Tinybop creates elegant educational applications to arouse curiosity, creativity and kindness in children around the world. Tinybop apps inspire children to explore, create and develop, dive into great ideas, test how things work and connect with the world in which they live.

Pear Deck - *Interactive presentation service*
(<https://www.peardeck.com/>)

Pear Deck allows you to create an interactive presentation for students in real time. Opportunities are provided for creating presentations from scratch, importing slides, inserting videos, web pages into slides, sending presentations to students at home for homework, or setting up quizzes.

Lithan - *Mentoring* (<https://www.lithan.com/>)

Lithan enables the updating of adult education through innovation teaching, continuous career advancement and people training, and provides training solutions for businesses. Using innovative technology, it helps adult students master their skills and develop their talents in order to be ready for the future in their work environment.

Canva - *Design for non-designers (amateurs)*
(<https://about.canva.com/>)

Canva enables incredibly easy creation of professional quality graphic projects. The Internet

platform brings together simple tools and a library with more than a million photos, graphics and fonts. Provides a service for making presentations, posters, blog content, greeting cards, web marketing materials, invitations, flyers and the like.

2.2. The latest software tools for different teaching approaches

Both parties (teachers and students) had to gather at the school in order for the process to be efficient and effective. With the advancement of technology, people can communicate without meeting at all or in reality (virtual connection). Here are describe top 5 online learning software in 2020: Docebo, Tutorroom, Versal, AdaptiveU, Mindflash [3].

1. Docebo (<https://www.docebo.com/>)

Docebo is one of the network platforms known to provide a wide range of services. It offers its clients training programs in various fields such as healthcare, processing and production, consulting, information technology and technology. Docebo allows users to manage lessons, share content between parties, and also takes the form of certification. Docebo can be accessed via computers and smartphones and user-friendly websites (they have applications that run on Android and iOS systems).

2. Tutorroom (<https://tutorroom.net/en/home/>)

Tutorroom is considered one of the best platforms for online learning. It has progressed by offering a top level classroom with an easy-to-use interface. The classroom contains features such as video chat, messaging and other collaboration tools. It has the best applications for teachers where the teacher can even download PDFs and follow the tests. Also, it offers educational programs for schools, network school management software, which can be run from computers and smartphones.

3. Versal (<https://versal.com/>)

Versal is an online learning platform that uses a cloud learning management system. Versal offers online courses that have hands-on training and involve user interaction. Their interface has video functions, performance evaluation, tests and report reception. Their courses are easily accessed using computers as well as mobile devices.

4. AdaptiveU (<https://www.adaptiveu.io/>)

AdaptiveU is an online learning software that can motivate a huge number of students and teachers as they learn. Teachers find and store large amounts of data that students constantly use and monitor student progress, and suggest tests. AdaptiveU can connect students and teachers through interactive videos and messages.

5. Mindflash (<https://mindflash.com/>)

Mindflash provides an efficient way to download video files, PowerPoint, PDF, Word and other types

of documents. Students' progress is monitored in real time, through quizzes. That is why it is designed to use a wide range of training programs. Mindflash can integrate with Salesforce (cloud-based online learning software) making it even more accessible.

So, successful online learning software must have the ability to provide a platform. The facilitates like creation, storage, delivery and monitoring of training materials increase software usage. It must also enable the monitoring of students' progress as well as their certification. The software should also be compatible with collaboration tools.

The above described online tutoring platform examples have maximized on ensuring that these factors are have been tactfully and diplomatically considered, thus ranking them among the best.

2.3 Educational software tools for communication

In the modern era of learning, new technologies play a key role in learning processes. Here are a few more tools that facilitate communication between teachers and students [4]: Edmodo, Socrative, Projeqt, TED-Ed, cK-12, ClassDojo, eduClipper, Storybird, Animoto

Today, there are various virtual learning tools, they are adapted to different ages, needs and abilities of users. The main tools used in 2020: Zoom, Google Classroom, Microsoft Teams, Blackboard, Slack, Floop, SmartSurvey, Edmodo, Timely, Dewo, Todoist, Pocket, Loom, Prezi, Dropbox Paper, WeTransfer, Touchcast, Idroo, Markup Hero [5].

Zoom - platform for online classes
(<https://zoom.us/>)

Zoom is a service for video conferencing, online meetings and distance learning. Anyone with an account can arrange a meeting. The free version allows video conferencing lasting from 40 minutes to 100 participants. The program is great for individual and group classes, students can access from a computer, tablet and mobile phone. Anyone with a connection or conference ID can join the video conference. An event can be scheduled in advance, as well as a recurring link, that is, for a permanent lesson at a specific time, the same application link can be made.

Google Classroom - completely free LMS
(<https://edu.google.com/products/classroom/>)

The Google Classroom Platform is an online management and communication platform for teachers and students. It allows you to: create lessons, set tasks, check their progress, monitor progress, share documents, post videos on YouTube. The application integrates easily with other G-Suite applications. Teachers can: save their documents from Google Drive, use Google spreadsheets to track students' overall progress, comment on and edit student work in real time, and

test students (created using Google Forms) through online surveys.

Microsoft Teams – digital learning hub
(<https://www.microsoft.com/en-gb/education/products/teams>)

Microsoft Teams is the software of the global IT giant designed to create space for corporate work, communication, file sharing, meeting coordination, creating team notes and more. The program is great for small working groups, as well as for those that contain several dozen participants. Microsoft introduced the service as part of the Office 365 suite and is a direct competitor to applications such as Slack and Hangouts. Microsoft Teams is integrated with most other Windows office and business products.

3. ORGANIZATION OF RESEARCH

In the school year 2019/20, 110 students of the Faculty of Technical Sciences in Čačak were anonymously surveyed. Questionnaire with mostly closed questions was used for the survey. The survey included students from the following study programs: Information Technology (IT) - first and fourth year, Engineering Management (IM) - first year, Entrepreneurial Management (EM) - first year, Electrical and Computer Engineering (ECE) - first and second year.

The survey included questions related to the application of software tools in online teaching. The questionnaire consisted of four parts:

- Part one: A series of statements to which the students responded with YES or NO (figure 1);
- Part two: A series of statements from which students choose one answer only (table 1);
- Part three: Assessment scale with a series of statements related to the use software tools in online teaching: General about software tools (table 2); Advantages of software tools application in online teaching (table 3); Disadvantages of software tools application in online teaching (table 4). It was necessary to enter the answer into the table that matches the opinion of the surveyed students for the corresponding statement the most. Possible answers were in categories from 1 (strongly disagree) to 5 (strongly agree);
- Part fourth: From the offered software tools for online teaching, students complete the tools (multiple choice): which they have used so far (table 5); tools they used in the current school year 2019/20 (table 6).

4. RESULTS AND DISCUSSION

This section gives the results of the research related to the application of software tools in online teaching for students of the Faculty of Technical Sciences in Čačak.

Figure 1 presents the answers of the surveyed students on questions in the first part of the survey.

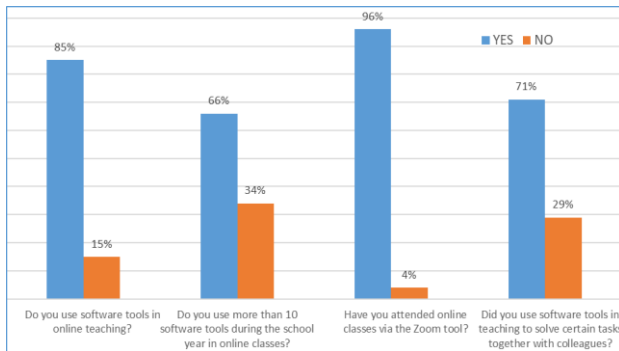


Figure 1. Overview of the application of software tools

More than 90 surveyed students (85%) used software tools in online classes, as many as 96% of students attended online classes via Zoom tools (as a consequence of the COVID-19!).

Table 1 presents the answers of the surveyed students on questions in the second part of the survey. Percentage of answers for every given answer of the question is shown.

Table 1. Answers of students in the second part of the survey

Question	YES
Through which device do you follow online classes? (more answers)	
Phone	29%
Tablet	3%
Desktop / laptop computer	64%
Something else	4%
How often do you access the E-LEARNING platform Moodle? (1 answer only)	
Daily	5%
Several times a week	81%
Several times a month	6%
Optionally	8%
How closely do you follow online classes? (1 answer only)	
Very carefully	31%
Pretty careful	48%
Not very carefully	21%

Students mostly follow online classes using computers (desktop or laptop) - 64%, Moodle platform is visited several times a week by 81% of respondents, online classes are followed carefully by almost 80% (quiet and very carefully).

Tables 2-4 shows the answers of the surveyed students on claims from the third part of the survey. The percentage of responses for the two dominant opinions is shown: agree and strongly agree.

Table 2. Assessment of claims that are generally related to the application of software tools in online teaching

GENERAL ABOUT SOFTWARE TOOLS	agree	strongly agree
Software tools are tools that fully enable the acquisition of knowledge in online teaching of a small number of subjects in studies	35%	44%
Software tools are tools that enable the acquisition of knowledge in online teaching of all subjects in studies	28%	21%
These software tools enable uninterrupted work in online teaching	38%	34%
Software tools are useful in online teaching	20%	74%
Software tools have more positive than negative aspects	15%	78%

A high percentage of surveyed students have a positive attitude towards the application of software tools for online teaching. They least agree with the statement: *Software tools are tools that enable the acquisition of knowledge in online teaching of all subjects in studies (49%)*.

Table 3. Advantages of software tools application in online teaching

ADVANTAGES OF SOFTWARE TOOLS APPLICATION IN ONLINE TEACHING	agree	strongly agree
Diversity and dynamism of online learning content (a large number of software tools of interest)	10%	88%
Flexibility in terms of accessibility, access, place and time of learning (any time, place and device)	5%	91%
The application of software tools enables easier understanding and mastering of teaching materials, and the use of multimedial didactic tools facilitates the acquisition of knowledge and opinions	20%	68%
Strong motivation to acquire knowledge	10%	86%

The advantage of using software tools in online teaching, which was highlighted as the most important, is Flexibility in terms of accessibility, access, place and time of learning (as many as 91% of surveyed students completely agree with this statement).

Table 4. Disadvantages of software tools application in online teaching

DISADVANTAGES OF SOFTWARE TOOLS APPLICATION IN ONLINE TEACHING	agree	strongly agree
The learning process is often not managed at all, or the role of learning leader is taken over by someone who does not meet the formal criteria	25%	51%
By applying software tools in online teaching, it gives the teacher more space to innovate and monitor individual student achievement	22%	62%
Staticity of participants in the learning process (neglect of other sources of information and knowledge - books, textbooks, tutorials ...)	10%	77%
By applying software tools for assessment, a realistic picture of the acquired student knowledge was not obtained	45%	54%

Almost all surveyed students (99%) agree that the application of software assessment tools did not give a realistic picture of the acquired knowledge of students.

Tables 5 and 6 shows the answers of the surveyed students on claims from the fourth part of the survey.

Table 5. Application of the listed software tools

Nearpod	Matific	Quizizz	TouchCast	Peardeck
Kahoot	ThingLink	Education City	TinyTap	Lithan
Buncee	Book	Microduino	EDPuzzle	Canva
Remind	Padlet	Explain	Tinybop	

Students used almost none of the offered software tools for online learning, with the exception of Nearpod (7 students) and Peardeck (4 students). Unfortunately, the other listed software was not used by students.

Table 6. Application of software tools in 2020

Zoom	Slack	Timely	Touchcast	Loom
Google	Floop	Dewo	Dropbox	Prezi
Microsoft Teams	SmartSurve	Todoist	Markup Hero	Idroo
Blackboard	Edmondo	Pocket	WeTransfer	

The most popular software tools used by students are: Zoom (96%), Prezi (90%), WeTransfer (45%) and Microsoft Teams (27%). These tools are covered in the following subjects: Practicum in computer applications, Practicum in computer use, Computer applications. Other software tools were rarely used or not used at all.

As shown in papers [6, 7] it can be said that the application of software tools is necessary regardless of the subjects studied. For the exchange of experiences in the use of a software tools can be discussed via the Internet forum [8].

5. CONCLUSION

In accordance to shown, it can be concluded:

- It would be useful to monitor the of software tools and platforms for e-learning;
- With the new needs of humanity, there has been a change in the way of teaching, both in schools and universities;
- Increasingly, online classes are conducted, using software tools, who seek solutions to problems of students in online teaching.

While students used to come to the faculty regularly, listen to classes, today very often they do it from their armchairs and follow the lecturer and solve problems with colleagues from all over the world who deal with similar issues, using various software tools.

Students believe that software tools are very useful and have more positive than negative aspects.

In addition, on the basis of the study, the following general conclusions can be derived:

- The largest percentage of students use software tools during their studies for several subjects (57,6%);
- Students used almost none of the offered new software tools for online learning, with the exception of Nearpod (7 students) and Peardeck (4 students);
- Listed software tools (table 5) was not used;
- More than 85% surveyed students used software tools in online classes, as many as 96% of students attended online classes via Zoom tools at the time of the pandemic COVID-19.

Given that a small number of students applied these tools in 2020, it is necessary to process these software tools within individual courses, and then practically apply different activities. In that way, the online teaching will be significantly improved.

REFERENCES

- [1] How N., Strauss W. (2000), *Millennials Rising: The Next Great Generation*, Knopf Doubleday Publishing Group.
- [2] <https://dyjalog.by/68-potryasayushhix-onlajn-instrumenta-dlya-uchitelej/>, Accessed July 2020
- [3] <https://tutorroom.net/en/online-tutoring/5-best-online-teaching-software-2019/>, Accessed July 2020
- [4] <https://elearningindustry.com/digital-education-tools-teachers-students>, Accessed July 2020
- [5] <https://memory.ai/timely-blog/online-teaching-software>, Accessed July 2020
- [6] Micić Ž., Ružičić V. (2018), Knowledge Sources in ICS Fields With Daily Intensity of Innovation – „TIE“-2017, *7th International scientific conference Technics and Informatics in Education - TIE 2018, Session 2: IT Education and Practice*, Čačak, 25-27 May, 2018., pp. 155-162.
- [7] Stanković, N., Micić, Ž., (2018) Innovating and management of the knowledge base on the example of IT applications, *Telematics and Informatics*, Available online 31 March 2018, <https://doi.org/10.1016/j.tele.2018.02.010>
- [8] Papić, M., Stanković, N., Jevtić, B., Pantelić N. (2016). Informal learning via Internet forum, *6th International scientific conference Technics and Informatics in Education - TIE 2016, Session 2: Information and educational technologies*, Čačak, 28-29 May, 2016., pp. 189-196.