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Материалы международной ежегодной научной Интернет-конференции «Новые образовательные стратегии в современном информационном пространстве» содержат работы, посвященные актуальным вопросам информатизации образования.

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Teachers' digital skills for the 21st century

The paper presents the first results of an international research on teacher skills for the digital age. With the purpose of identifying a list of skills that teachers need in the digital age, a survey among university teachers, trainers and secondary level teachers was carried out and the importance of the results was classified according to the Cronbach's Alpha for Reliable Surveys. The video presentation of this research paper is available at: https://youtu.be/gd1dsxtmL5I.

Цифровые умения педагогов в 21 веке

В статье представлены первые результаты международного исследования, посвященного педагогическим умениям в эпоху цифровых технологий. С целью определения перечня умений, необходимых учителям в 21 веке, был проведен опрос среди преподавателей университетов, тьюторов и учителей средней школы. Для определения надежности полученных результатов был использован коэффициент альфа Кронбаха. С видео презентацией данного исследования можно ознакомиться по адресу: https://youtu.be/gd1dsxtmL5I.

When we reflect on the topic of didactic skills in the digital age, we face immediately the question: which are the required skills for a good teacher in the

digital age? Two decades ago and earlier, to be a good teacher it was enough to be an expert in one subject. One decade ago, in addition to a solid experience in a specific subject, pedagogical and didactic skills were also necessary. Among these skills, we can mention skills of presenting a content in a multimedia format, tutoring, in presence and online, formative continuous assessment, and skills of an LMS use. In addition, teachers needs to know how to use a virtual classroom, when working in a distance mode, and some other digital skills.

Digital skills and competences are widely debated today [1, 2, 3, 4]. For example, the European Framework for the Digital Competence of Educators "DigCompEdu" suggests 22 elementary competences organised in six areas: Professional Engagement, Digital Resources, Teaching and Learning, Assessment, Empowering Learners, Facilitating Learners' Digital Competence [5]. Another approach to the problem is the concept of "pedagogical ICT tools", which makes it possible to identify the necessary professional teacher activity transformations in electronic educational environment [6].

In fact, the concept of teaching in the digital age can be understood as "blended teaching". It means that if you are teaching in a presence course, you should know many techniques, e.g., using computers, the Internet, and additional applications. Nevertheless, if you are teaching at distance, you should know as well, a complex of "face-to-face" methods and techniques. This is blended teaching, and this is what we need today, because we should know how to teach with new methodologies and ICT tools.

In addition, it is important to teach students how to learn and how to manage large quantities of information in order to help them become better learners. For example, on the website "Teach.in.digital.age" there is a lot of useful content related to this topic in video format, and in a printable format https://sites.google.com/view/teachindigitalage.

In order to answer the question "What skills do teachers need in the digital age?" we carried out a survey. The sample of the research included university teachers, trainers and secondary level teachers, the total of participants fulfilled the Cronbach's Alpha requirements. More than 60% of these participants were European university teachers; in addition, there were 8% from Russia and 9.2% from Latin America and other countries.

We identified 10 groups of topics, presented in Table I.

Table I. Groups of digital skills topics

#	Groups of Topics
1	General aspects
2	Source of information and research
3	Communication and collaborative work
4	Publish contents and works
5	Organise images and videos

6	Social network and manage communities
7	Territorial information, maps and organise trips
8	Source of applications and utilities
9	Online agenda
10	Other recommended

The 50 topics identified for the analyses are listed in Table II.

Table II. Digital skills topics

#	Topic
1	Audio and video communication;
2	Automatic translator;
3	Basics about communication using your mail;
4	Basics about editing images, photos and videos;
5	Basics about hardware/operating system maintenance;
6	Basics about installing/uninstalling applications;
7	Basics about security and ethics in the Internet;
8	Basics about the Internet;
9	Basics to record audio and video;
10	Children digital games;
11	Cloud environment - Google drive;
12	Cloud environment – Dropbox;
13	Cloud environment – OneDrive;
14	Creating a DVD;
15	Creating an e-book;
16	Creating and managing your communities;
17	Creating conceptual maps;
18	Details about editing your photos and videos for publishing;
19	Downloading music sources – Databases;
20	Google Classroom;
21	Google Cultural Institute;
22	Google Earth;
23	Google for education;
24	Google Play/Apple Store/Windows Marketplace;

25	How to browse and search on the Internet;
26	How to generate YouTube subtitles in all languages;
27	How to use social networks;
28	Making online surveys and inquires;
29	Making a word cloud;
30	Making your blog and publishing your documents, contents and experiences;
31	Making your own pedagogical games;
32	Making your website, and publishing your documents, contents and experiences;
33	Measuring your bandwidth;
34	Mobile applications for pedagogical use;
35	Optimising your digital agenda;
36	Organising a meeting and synchronising agendas;
37	Publishing a PPT – SlideShare;
38	Publishing your photos/ videos / contents in your video channel (create YouTube channel);
39	RCW - Remote collaborative work technics and tools;
40	RCW – Hangout;
41	RCW – Mikogo;
42	RCW – Skype;
43	RCW – TeamViewer;
44	Screen capture and Copy images from Internet;
45	Shortening a URL;
46	The world virtual tour. Organising your trips: maps, distance and alternative circuits;
47	Time zone converter;
48	Using WeTransfer to send large files;
49	Virtual reality;
50	YouTube for education.

We divided the importance of each topic under research in five levels of importance: very low, low, interesting, high and very high. As a result, 15 of the topics were marked as “very high”; 19 topics were classified as “high”. This means, that more than 80% of all topics had the fourth and the fifth degree of importance.

In addition, 13 of the topics were classified as recommended (interesting) topics. With a very low interest were only 3 topics from all those 50 we had in our analysis. The summary of the results is presented in Figure 1.

Figure 1. Summary of the survey results

Among the topics of a "very high" importance are basics about communication using an email; basics about security; basics about installing applications; basics about searching on Internet and some others. All of these topics are mandatory. It is absolutely necessary that teachers know how to use them in the 21st century. In addition, we had more topics of a very high interest, classified as "++": automatic translation, downloading music for backgrounds, Google hangout, cloud environment (e.g., Google Drive, one Drive, Dropbox). It is important that we have these technologies available today, but we need more, for example, to transfer large files, to make a website or a blog, to publish documents, to mark a geo position on Google Earth and many others. The other group of topics marked as "high" and "very high" includes knowing how to create and shorten an URL, basics about

hardware, time zone converters, creating an e-book, using TeamViewer (screen sharing collaboration).

Not as important as those pointed out before, but still important are digital games for children. Finally, we had several topics, e.g., measuring your bandwidth and Creating DVDs with a low interest. This can be explained by a very fast development of technologies. The results of the survey are presented in video format, available at https://youtu.be/j1vl5FTnPYs.

The prospective of the research includes, firstly, interviewing experts from the most relevant universities in Europe, USA, Russia and other countries for the purpose of elaboration a list of recommended ICT tools and digital skills for teachers. Secondly, we plan preparing video tutorials and text tutorials about each of the topics evaluated and identified (two examples of video tutorials about digital skills are already available: Internet – https://youtu.be/iIqVU660alA Shorten URL - https://youtu.be/-a54k-6Wrwg). Finally, the results will be published in text and video, with automatic translation, into all languages to be available for the international scientific community.

Comments and debate suggestions topics can be posted at the Community of the school of the future at: https://goo.gl/rEgNnX.

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