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## editorial



## articles

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## Increasing digital competencies - the growth of education in society (Visegrad project)

Until recently, the focus of the professional public was still on the use of information and communication technologies in the educational process, but so far many schools are not sufficiently equipped and teachers are not sufficiently prepared to work meaningfully and effectively with them. Nevertheless, there is now a need to go even further and focus on exploiting the opportunities offered by the digital space, as the European Union is aware of. Its initiatives aim to provide teachers with a sufficient number of opportunities to achieve high digital competence. In connection with the needs of the Z generation and the penetration of digital technologies into the field of education, new requirements are placed on the learning environment, school facilities, but also on teachers. Teachers are representatives of the X. This can cause problems for teachers, as they are required to keep up with the times and always be informed about technological developments, use it constructively and to be able to adapt modern technologies to the needs of the teaching process so that they are in line with the needs of the pupils. For the reasons mentioned above (among other things, the admission of high school students to our university), we feel the need to create a platform for high school educators to improve their technology, acquire (for them) new experience and skills to manage the teaching process more effectively - members of Z. Our project would be aimed at secondary school teachers, "bringing up" the following generations of students.

The aim of the project is to analyze the current state of use of digital skills of secondary school teachers and their students in the educational process (for each of the participating countries). Based on the results of this analysis, create educational e-learning modules that would reflect the identified shortcomings.
Involvement of our department within the project:

1. Questionnaire survey and its analysis throughout the Czech Republic (approximately to the survey attended by 2,600 students and 700 teachers)
2. Qualitative research
3. Creating e-learning modules
4. Conducting workshops for secondary school teachers in the Czech Republic

Tomas Javorcik

Executive Editor

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# USING AN APPLICATION ACTIONBOUND IN A PHYSICS LESSON IN ELEMENTARY SCHOOL

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**ABSTRACT**

The paper deals with the description of the Actionbound application, both its web interface and the description of the mobile application. The application itself was originally designed to play geolocation games. However, it can also be used for educational purposes, because it can be filled with any content. The paper describes its use in a physics class in the sixth grade at primary school. In class, the application was used for group work.During the class there was an increase in motivation and significant support for group work. Pupils worked biased in class, fully dedicated to solving problems. After working in class, they downloaded the application to their personal devices.

**KEYWORDS**

*tablet, physics, education, motivation, group work*

## 1 INTRODUCTION

Digital technology

Digital technologies are increasingly penetrating our everyday lives and are also being promoted as essential teaching aids in our schools. We can call digital technologies desktop and laptop computers, tablets, mobile phones, digital cameras.

According to Beauchamp, Parkinson (2008), their use leads to increased interest in scientific phenomena. The results of this research show that the use of digital technologies in the teaching of science subjects leads more easily to the achievement of the set learning goal. The benefit of meaningful use of digital technologies is mainly in increasing pupils 'interest in scientific phenomena and there is also an improvement in pupils' communication skills.

This is also confirmed by Slussareff, Boháčková (2016), when at the end of their work they say that the pupils themselves claim that they can now better communicate with each other and that they will continue to be interested in the topic being covered.

Digital technologies in Physics teaching

The educational field of Physics belongs to the educational area of Man and Nature. FEP ZV (2017) for this educational area states that education in the given educational area aims to form and develop key competencies by leading the student to explore natural facts and their context using various empirical methods of cognition (observation, measurement, experiment) and different methods of rational reasoning.

Furthermore, the FEP ZV defines key competencies as a set of skills, knowledge, abilities, attitudes and values, important for the personal development and application of each member in society. They are formulated quite broadly so that they can be affected by every field of education, the competencies related to digital technologies are completely missing in the current version. Mention of them can be found in the communicative competence - the student uses information and communication tools and technologies for quality and effective communication with the outside world.

Digital technologies, which are promoted in the everyday life of students, can retroactively influence the content of the educational field of physics (and all other educational fields).

The categorization of mobile applications is described by several authors, but from different perspectives and points of view. Naismith et al. (2014) divides mobile applications into six categories based on general pedagogical theories and approaches, also adds one category for organizational tools (behaviorism, constructivism, situational pedagogy, collaborative teaching, informal education, support for teaching organization). Traxler (2009) divides the more general level of the m-learning strategy according to the actual use of mobile tools, where he focuses on the influence of technology on the course of the pedagogical process. We do not find a direct division of applications with it, which, however, is understandable given the time of the research. Similarly, Waard (2014) categorizes according to the degree of simplicity of implementing mobile devices into the learning environment. In its categorization we can also find the part dedicated to the application, where it is divided into native mobile applications, web applications and applications developed directly according to the needs of the educational institution. Waard also introduces one category of devices and applications in which the use of integrated sensors is possible. Artal-Sevil et al. (2015) by dividing free applications into the following categories - communication support, sharing support, organizational applications, classroom support, applications for everyday use and specialized applications. Targeted division of mobile applications was then performed by the authors Chergui, Begdouri and Groux-Leclet (2017) into three basic categories, which are then divided separately. The main three categories are the areas of pupil support, teacher support and mutual cooperation. Apart from mobile applications, a similar breakdown was also made by Klubal (2017) for web applications for education according to activities performed during teaching.

As part of our work, where we focus on the use of mobile devices in teaching physics, we have proposed a division according to what the application is used for.

- Applications for measuring physical quantities. This includes applications that work with sensors directly built into the mobile device or with additional sensors that connect to the device. An example is Phyphox or Pasco Sparkvue.
- Applications used to practice physical phenomena and laws. They can already be filled with content - for example Cat physics or Ball Pass 3D. These are applications that focus only on a single physical phenomenon. The first of these applications practices only the law of impact and reflection. The second practices the law of conservation of energy in a gym environment.
- Applications that are filled with content, but when used, the student applies physical knowledge in a certain way and can also develop their own creativity. Its use can help the student fulfill the competences for the 21st century. Such an application can be, for example, Bridge Constructor Playground. In it, the student builds bridges. It has only limited resources. In order for the bridge to be stable, the pupil must

observe the physical laws (folding and decomposition of forces) and at the same time the pupil can involve his creativity during the construction.

- Applications that the content is filled with by the teacher. Pupils can practice physical phenomena and patterns in them, but also measure (after connection with an application that allows measurement). Such applications offer the possibility of individualizing teaching, adapting to the needs of a particular class, the possibility of use for any physical content. Such an application is, for example, the Science journal or the Actionbound application.

## 2 DESCRIPTION OF THE ACTIONBOUND APPLICATION

Actionbound applications are among those that a teacher can fill with their own content. The student can go through the assigned tasks himself or he can perform them in a group. The applications that are used for measurement can also be integrated into the application. It can contain different types of tasks, it can be set to run tasks at specified coordinates. The progress of the work and the results remain stored in the application, so the teacher can see at any time which tasks the student failed to complete and which he managed without any problems. The teacher registers, submits tasks and monitors the pupil's results in the web interface (Figure 1), the pupils 'work is used by an application installed on the pupils' (or school's) mobile devices (Figure 3). The application exists for iOS and Android operating systems.

The teacher inserts the content into the application in the Content tab, application settings, ie. whether the pupils perform the tasks each by themselves or in a group, whether the order of the questions is fixed or can be changed, the duration of the game, the name, etc. is done in the Settings tab. It is also possible to set whether pupils see, where possible, the correct result immediately after sending the answer.

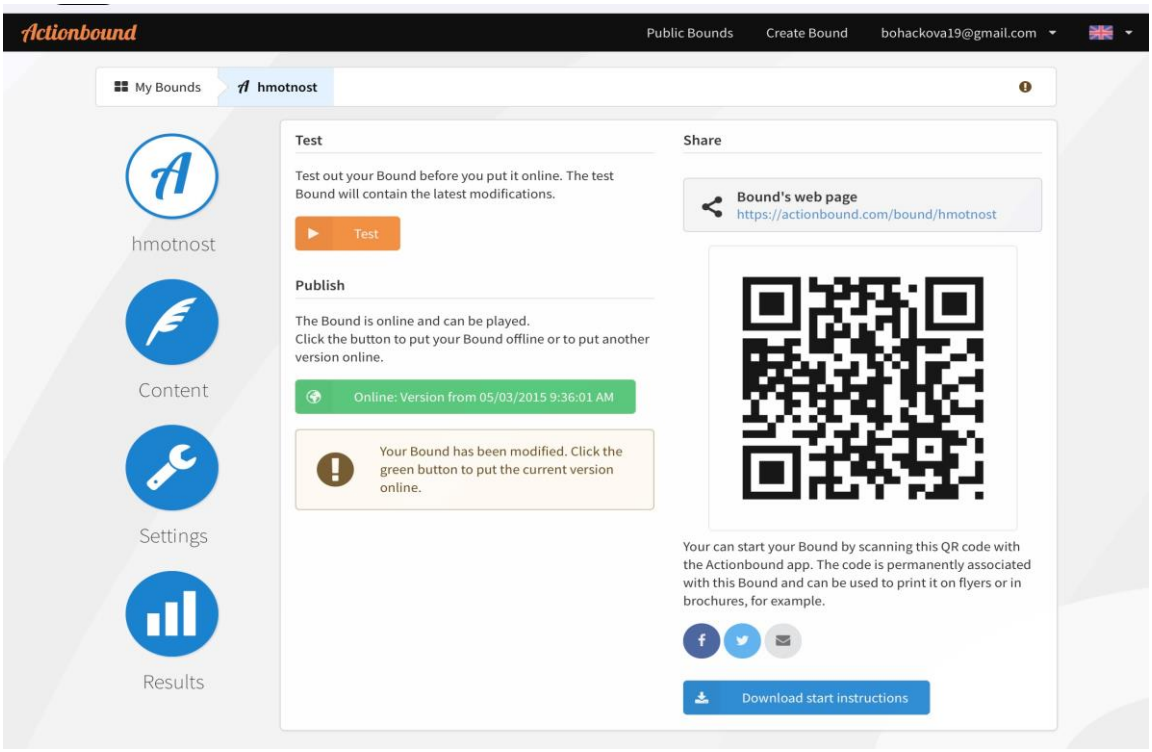


**Figure 1** Home page of the application web

In the Results tab, the teacher sees the results (Figure 2). First, he can get acquainted with the overview - how many students solved the game in total, how long it took to solve the game, what is the average time per game, how the students themselves evaluated the game in terms of various aspects, you can get a graphical overview. Then you can get an overview of individual players, such as how long they played the game, which tasks they managed to complete, where they made a mistake, etc.

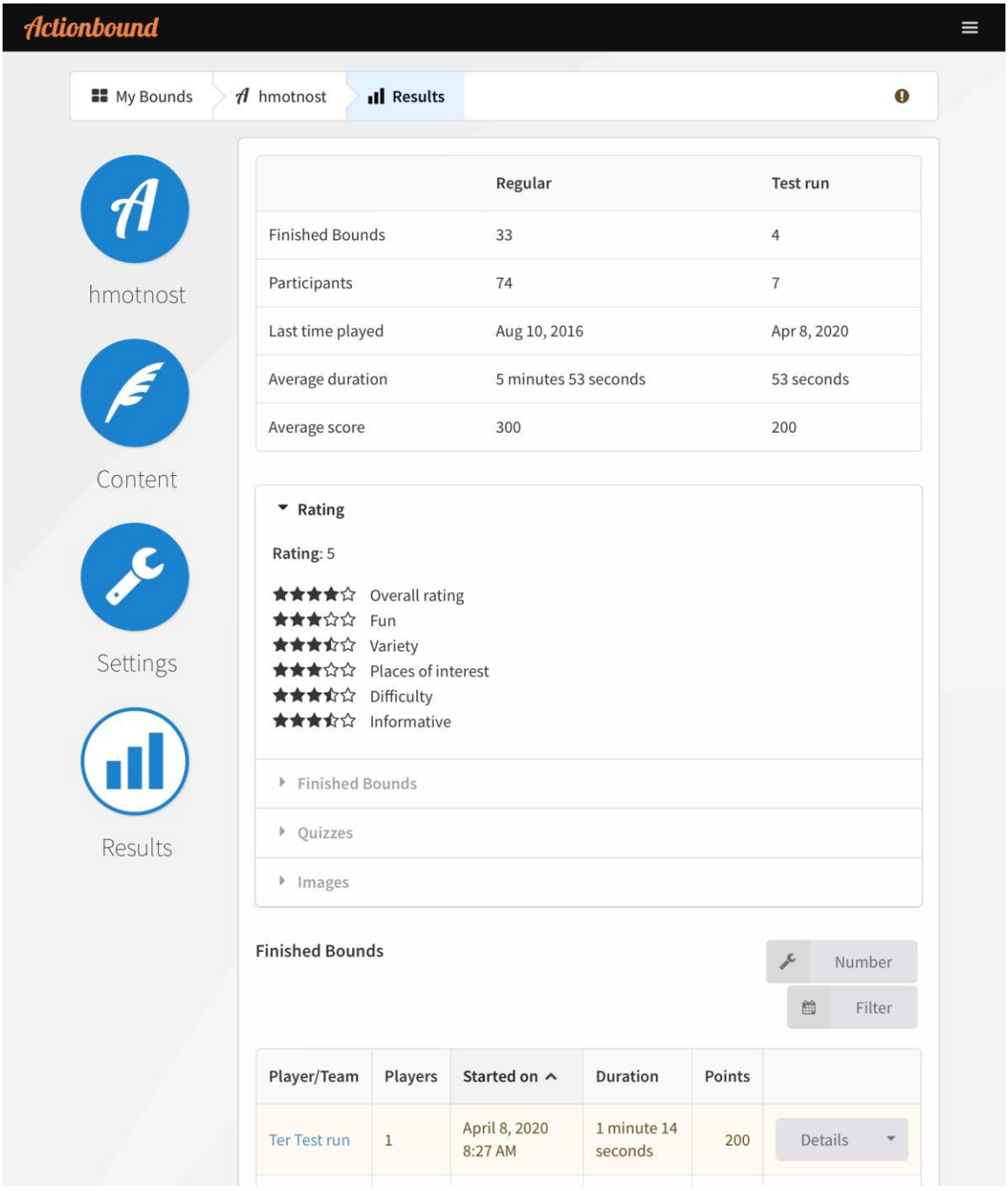


**Figure 2** Results tab

The mobile application is used to solve tasks. Pupils launch the application (Figure 3), write down their name or group name (and the names of the individual members of the group) and can start solving tasks. Possible types of tasks: selection from multiple answers (Figure 4), sorting values according to a certain key, taking or recording a video, short answer to a question, yes / no questions. It is also possible to set students to go to a certain place (coordinates are set, GPS is required) where they will complete the task.

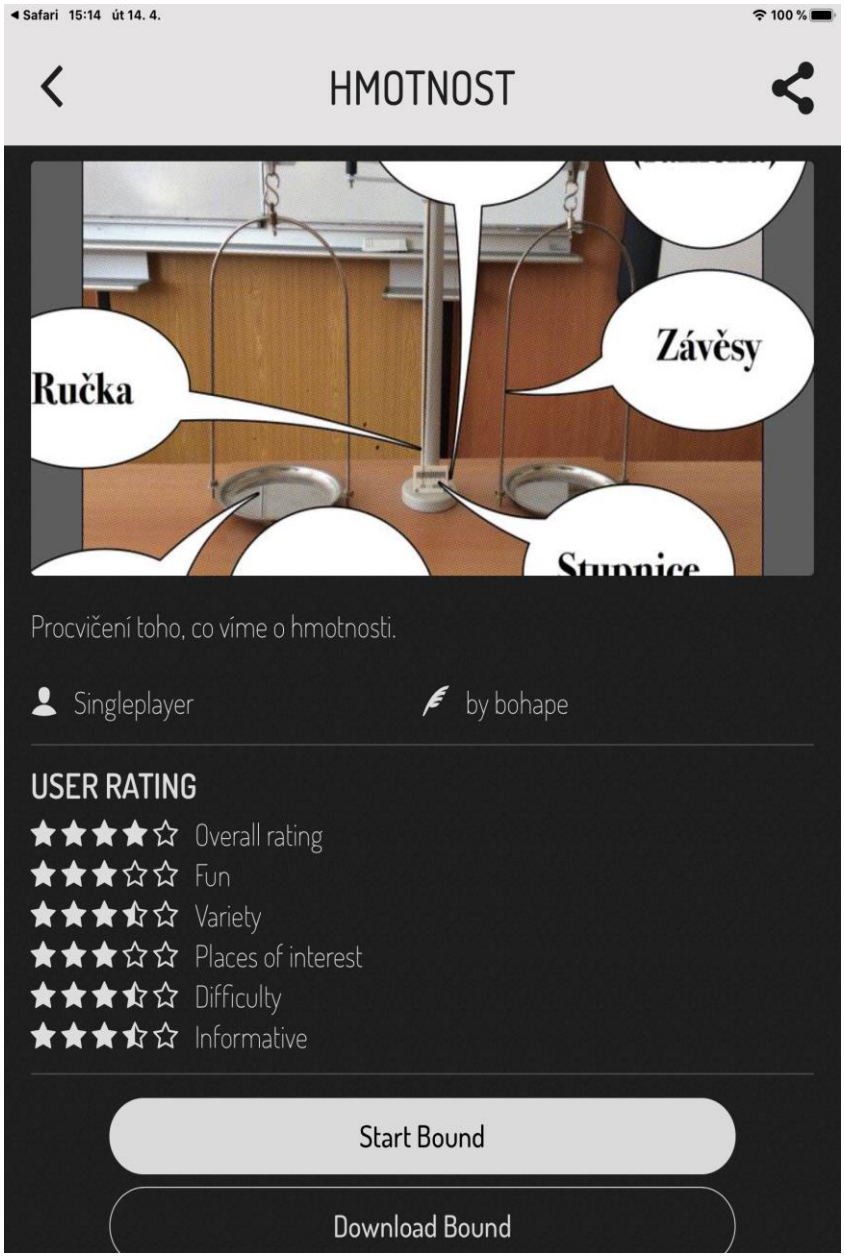


**Figure 3** Mobile application first screen

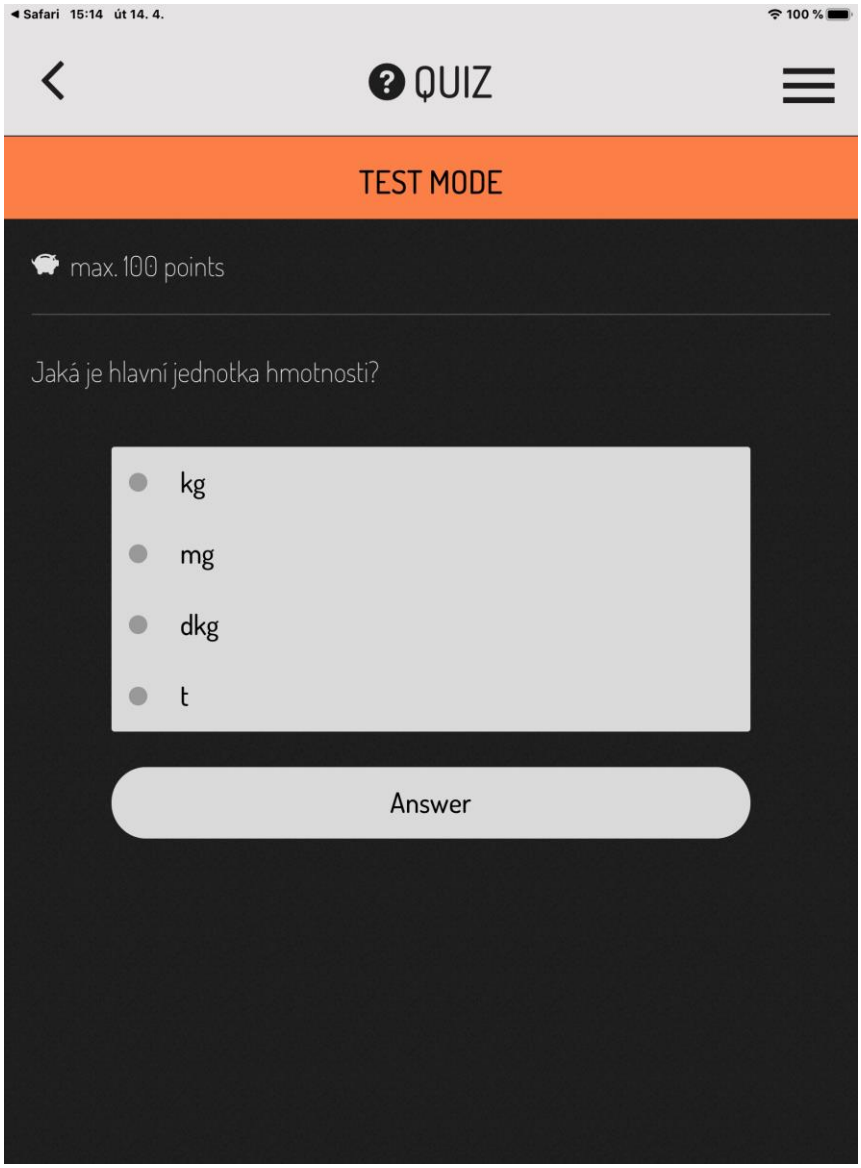


**Figure 4** Task type - selection from several options

## 3 IMPLEMENTATION OF A PHYSICS LESSON

This chapter describes the implementation of the lesson using the Actionbound application.

The aim of this study was to monitor whether the use of the application will increase the motivation of students and whether group work will be supported. The lesson was realized at the second stage of primary school in the sixth grade. The lesson was realized with 26 pupils aged 11 - 12 years. The aim of the lesson was to meet the expected output of F-9-1-01. The partial goal was to find out by observing whether the use of this application has an effect on the motivation of the student at work. During the lesson, it was also observed how the students work together in a group and what is the motivation for their work. Observations were made during the lesson by a teacher's assistant.

The lesson passed, resp. was started and ended in the specialized class Future classroom lab. This classroom is flexible enough, the furniture can be easily moved, it allows teachers to easily carry out group work in groups of different numbers of students, or where students can work on different projects. It is equipped

with tablets, two 3D printers, different types of robots and different sensors. It is used in teaching various subjects.

At the beginning of the lesson, the teacher introduced the students to the aim of the lesson. She explained how to load the prepared game into Actionbound. The teacher also agreed with the pupils in which part of the school they would move if they needed to leave the class. Although the whole school is equipped with a wi-fi connection and the school tablets were connected to this network throughout the use, it was not necessary for the functionality of the application, only after completing the tasks (at the end of the lesson) the results had to be sent and therefore be on wi-fi connected.

Furthermore, the students created groups according to their discretion. The whole introductory briefing and group formation took 5 minutes.

The Actionbound application was used, installed on school tablets, but for the opportunity to use their mobile devices was also offered (they could download the application in an hour).

Pupils spontaneously used a pencil and paper at work. They made notes on paper when solving tasks, solved the tasks on paper and only entered the agreed solution into the application.

Pupils discussed the results in the group and tried to find the right solution, no one tried to click or estimate the results at random. The written solution was always the result of a group discussion. They chose very carefully, especially for questions where they had to show creativity (find and photograph a body that has a certain weight).

The students worked very interested, they did not interfere with each other. The assistant observed that if one group was interrupted by another, the groups were able to agree on a volume level. The competence to solve the problem has therefore shifted from teacher - pupil to pupil - pupil, ie. that the students were so impressed by the work that they were able to correct themselves and, if necessary, reduce the noise level at work.

Work with the application took place until the end of the lesson, the fastest group finished work 6 minutes before the end of the lesson, one group finished work 3 minutes after the end of the lesson.

## CONCLUSION

During the lesson, the motivation of the pupils and their work in the group was mainly monitored. Motivation to work with the application was very high and natural on the part of the students. There was no need for correction by the teacher throughout the pupils' work. The fact that they could be divided into groups at their own discretion could also have a possible effect on the pupils' motivation.

The offer to download the application to one's own devices remained unused before this lesson, but after the end of the lesson, seven students downloaded the application and installed it on their mobile devices.

The observed lesson took place in a specialised classroom, but could it take place anywhere, the tablets can be easily moved.

The use of digital technologies in the teaching of science subjects certainly makes sense, especially for the motivation of students. Their use supports the cooperation of students in a group.

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# SMART EDUCATION – EVOLUTION IN DIGITAL WORLD IN CONDITIONS OF INTERNATIONALISATION OF HIGHER EDUCATION – EXPERTS' OPINIONS

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**ABSTRACT**

This article focuses on Smart Education – Evolution in Digital World in Conditions of Internationalisation of Higher Education as viewed by experts from different countries: the Czech Republic, Poland, Portugal, Slovakia, Spain, Russia and Ukraine. The article aims to provide opinions, views and reflections on important topics addressed by International scientific DLCC2018 conference participants (www.dlcc.us.edu.pl) o the topics: Smart Education – Evolution; Preparation of New Generation Specialists in and for Digital World; Internationalisation of Education – Trends; On-Line Courses Assessment; Ethical Issues Affecting the Implementation of E-Learning; E-Learning in Inclusive Education. The article aims to provide opinions, views and reflections on important topics by experts in the area of e-learning. Article additionally includes the background research and some conclusions.

**KEYWORDS**

*Smart education, Internationalization, Competences, Higher education, Experts, Digital World*

## 1 INTRODUCTION

"The development of communication channels and means of communication and information exchange leads to a new world of an „evolutionary spiral", transforming the information society into what is nowadays commonly referred to as a smart society. Such a policy, a strategy to be adopted at the international level, is now perceived as the only possible in the modern world." (Smyrnova–Trybulska: 2018: p. 440).

The debate, which was held in October 2018 within the framework of DLCC2018 conference, focuses on Smart Education – Evolution in Digital World in Conditions of Internationalisation of Higher Education consists of 6 topics as viewed by experts from several universities, located in Western, Central and Eastern Europe - Czech Republic, Poland, Portugal, Slovakia, Spain, Russia and Ukraine. The article aims to provide opinions, views and reflections on important topics by experts in the area of e-learning in particular:

1) Smart Education – Evolution,

2) Preparation of New Generation Specialists in and for Digital World,

3) Internationalisation of Education – Trends,

4) On-Line Courses Assessment,

5) Ethical Issues Affecting the Implementation of E-Learning,

6) E-Learning in Inclusive Education.

Article additionally includes the background research and some conclusions.

## 2 BACKGROUND RESEARCH

Researchers from different countries conducting comprehensive research and study on conception of the smart learning and teaching.
Some researchers consider the smart education as an elaborating educational service system for equal quality education and proposed a creation of educational service system model to improve the quality of high school education services based on Moodle system (Putra & Putro, 2019).
B. Gros (2016) proposed a comprehensive approach in the design of smart educational environments and "discusses the key characteristics of smart learning and the main challenges to be overcome when designing smart educational environments to support personalization" (Gros, 2016, p. 1). She analyzed also a several definitions and description of the smart educational environments and comments there. For example, "According to Hwang (2015) three key features define a smart learning environment:

1. Context-aware: the system must be able to provide learning support based on learners' online and real-world status;
2. Adaptive support: the system must offer instant and adaptive support to learners based on their individual needs from different perspectives (learning performance, learning behaviours, profiles, personal factors, etc.), as well as the online and real- world contexts in which they are situated;
3. Adaptive interface: the system must be able to adapt the interface to the user (ways of presenting information, learning preferences, learning performance, etc.) The user interface can be any mobile device (smartphones, tablet computers, etc.), wearable device (a digital wristwatch), or even ubiquitous computing systems embedded in everyday objects. (Hwang et al., 2015)" (Gros, 2016, p. 4)

As stressed other experts "Many principles of smart education are not explained now because of ambiguity of this concept. …. Educational projects, which represent the vast majority of key components of smart education, can be regarded as the parts of smart educational trend. Three of the most important components

– main dimensions of smart education - are identified and analyzed in this paper: educational outcomes, ICT, and organizational dimensions." (Tikhomirov et al., 2015, p.47)

The transformation of the traditional university into the Smart university is one of the contemporary trends of modernisation of higher education. The concept of Smart university (SMU) includes several main components:

- Students, lecturers, administration (e.g.: Blended or fully Online, Life-long learners (retirees) in open education);
- Smart pedagogy (e.g. Collaborative teaching-learning, Learning-by-doing, Adaptive teaching-learning, Flipped classroom);
- Smart Classroom (e.g. Smart classrooms with corresponding technologies. Software hardware systems. Smart pedagogy for smart education);
- Technologies (e.g.: cloud computing technology, 3D visualization technology);
- Software systems (e.g. Web-lecturing systems, Systems for seamless collaborative learning);
- Hardware/Equipment/devices (e.g., Panoramic video cameras, SMART boards and/or interactive white boards, etc.)
- Smart curricula (e.g. Adaptive programs of study, Adaptive courses (with various types of teaching form: face-to-face, blended, online), (Uskov, Howlett, Jain, 2015)
- Open Source publication (e.g., Repository, Digital Library, WIKI, MOOCs, etc.). (Smyrnova–Trybulska, 2018b)

## 3 SMART EDUCATION – EVOLUTION

The first topic concerns SMART education was his evolution. Some researchers stressed that "Evolution is not enough: Revolutionizing Current Learning Environments to Smart Learning Environments" and they "looks at these challenges with a view towards revolutionizing current learning environments to smart learning environments and provides new suggestions for technological solutions." (Kinshuk, Chen, Cheng, *et al.* 2016, p. 561). In particular they noted that "The future perspectives of smart learning environments are reviewed and shared, through examples of emerging innovations such as the flipped classroom, game based learning, gesture based learning, along with pedagogical shifts, such as life-long learning portfolio maintenance, team teaching, and separation of learning and competency assessment." (Kinshuk, Chen, Cheng, *et al.*, 2016, p. 561).

*Professor Nataliia Morze from Borys Grychenko Kyiv University (BGKU), Ukraine* noted that during the Smart Society formation the paradigm of education and educational technology is naturally changing. The tasks of training of the new format specialist, successful and competent to work in the Smart Society rely on new universities – Smart Universities where the integration of technological innovations and the Internet can provide a new quality of educational and scientific processes, the results of training, scientific, innovation, educational, social and other activities. Professor Nataliia Morze said that multiple remarkable changes could be seen every year. They have a serious impact on students' perspective on education and the learning outcomes and on SMART-education. They depend on numerous factors including available resources, options affordable for society at large and the changing needs or demands of present generation students.

She expressed hope that these changes would benefit the modern student and allow the educational institutions to make the best use of them for citizens in tomorrow's SMART-society."

*Professor Prudencia Gutiérrez Esteban from University of Extremadura (UEx), Spain* stressed that at present, the rapid transition from the knowledge society to the society of global competition is considerable, where the economy and educational systems both undergo changes inherent in this new global context. Thus, teaching in the classroom has been complemented with virtual spaces for the training offered by educational institutions, under the profusion of the different modalities of virtual training mainly through learning management systems (LMS). Over the years, learning trends have been growing and training modalities have been increasing with the appearance of new devices, objectives, scenarios and / or uses.

It is evident that without an innovative implementation and without notable methodological changes in the education system, it will not be possible to achieve the objectives proposed in the programs such as Europe2020. At the same time, the strategies and design of virtual training programs are not fully developed to enable the development of skills, especially digital and social competence, both of which are necessary to have control over the systematic use of digital technologies. The education of the next generations has as a challenge to progress, although it cannot anticipate what the needs of the future will be, providing tools that citizens can develop and learn in these changing environments, working to improve the future of everyone from the school.

At the same time, it is becoming increasingly necessary to influence the idea that students' informal learning models are moving at a different speed from that of the evolution of teacher teaching models. The introduction of the digital environment in daily learning reconfigures these learning processes. With growing awareness of this new scenario, informal learning facilitates the adoption of training models adapted to these changes, with organizational structures and teaching designs that make it possible. While the natural approach of virtual training models - which is based on needs and the adoption of new environments for the socialization of knowledge - is changing, educational policies do not do so.

However, *Professor Prudencia Gutiérrez Esteban* stressed that she was not talking about novel and unique phenomena throughout history, but already at other times, these changes also entailed difficulties and challenges that humanity had to face, which required a change of mentality, both in the type of support for the transmission of knowledge, as in the concept that was held until then of teaching and learning, after the implications of those changes.

In addition, the new educational models bring with them a renewal of the places of learning to give particular answers to the different teaching methodologies, approaches and theories of learning. In this way, a great diversity of approaches is found on the educational space in terms of the modality of learning. As for digital spaces, they give us the opportunity to extend the educational experience outside the classroom generating an "invisible learning" (Cobo & Moravec, 2010) that not only fuses the formal and informal learning environments, but also allows for bringing the outside world to class thanks to the smart schools, which, as Taleb and Hassanzadeh (2015) maintain, pursue learning according to the information and communication era. There are even those who already speak of smart learning environments (Kinshuk, Chen, Chen and Chew, 2016).

To finish, we intend to make evident the different choices in the initial teacher training, where the scenario in which learning takes place is not an irrelevant element. As Kühn (2017) finds, students are not always prepared to (re) design their Personal Learning Environment, since their behavior in digital spaces moves between resident and visitor profiles (White, 2016). Particularly for these reasons, the aid provided to students, should be based on a scaffolding structure that allows this redesign, as already postulated by Dodge (1995, cited by Wang & Hannafin, 2008) when referring to the design of the webquest during initial teacher training.

*Professor Olga Yakovleva from Herzen State Pedagogical University of Russia, St. Petersburg (HSPU), Russia* notes that the concept of “smart” technologies had evolved from aerospace technologies about 40 years ago. Technologies were considered to be “smart” when they could present a quick adaptation to the environment, and could respond to signals received by a set of system sensors. Smart education is understood as an educational system providing Internet-based interaction with the environment and the

process of training and education for citizens to acquire the necessary knowledge, skills, abilities and competencies.

The reasons for the development of smart education ideas include:

- Technological (Transformations of technologies)
- Social (new generations, digital society, new education, competences)
- Economical (digital economy)

The main principles of smart education are as follows:

- The most up-to-date information for educational programmes, its real-time update paradigm
- Organization of self-cognitive research, project activities of students
- Implementation of the learning process in a distributed learning environment.
- Student interaction with the professional community.
- Flexible educational trajectories, individualization of learning.
- Variety of educational activities

The concept "University 3.0" is also now widely used, implying a radical restructuring of the educational process - an active project activity of students, the creation of innovative enterprises along with training, internships.

At the end of our discussion and analysis of the first topic a conclusion can be drawn that the nowadays of the development of higher vocational education we could observe changing the concept of educational process to personalized and increased quality of learning and teaching via using, in particular, the elements of artificial intelligence, augmented reality, STEM and STEAM education, blockchain technology, SMART environment, formative assessment solution, professional development of teachers and comprehensive use of e-learning.

## 4 PREPARATION OF NEW GENERATION SPECIALISTS IN AND FOR DIGITAL WORLD

The topic of preparation of new generation specialists in and for digital world is in focus of the researchers around of the worlds.

Using some innovative methods, in particular, project-based learning in training of a new generation of specialists: a corporative analysis described in his research Beta (2018). Formation of principles of new generation educational standards analysed in their study Salov, Pismenkova (2012).

The experts from different countries discussed on the using of e-learning in the training of professionals in the knowledge society in (Smyrnova–Trybulska, (Ed.), 2010). The innovative MA Programme "E-learning in Cultural Diversity" was presented and detail analysed by Smyrnova-Trubulska and Morze (2019).

*Professor Halina Widła from University of Silesia (US), Poland* during discussion stressed that much is being said about the necessity of universal preparation of young people for living in the digital world. However, the question arises as to who is to prepare them for it. A generation of teachers who feel comfortable in the digital environment is constantly growing. Yet some problems remain. First of all, the academia poorly educates teachers in this regard. Secondly, teachers of the older generation would also like to benefit from opportunities to learn new skills. But universities do not sufficiently consider their needs in this area. The offer of postgraduate studies does not include such preparation. Fortunately, other entities are joining this race:

In Poland, the E-learning Academic Association (Stowarzyszenie E-learningu Akademickiego or SEA; http://www.sea.edu.pl) organizes two types of examinations every year: for e-teachers and e-methodologists. Participants must meet high requirements in accordance with standards developed by SEA specialists. A team of 27 people prepared a set of criteria which covers four areas: organization of the course, preparation of the course, conducting the course, evaluation of the course. The results of their work help to organize and consolidate knowledge of participants in the field of e-learning, through the prism of their own experience. In this way, SEA confirms their professional skills.

*Professor Nataliia Morze,* during the round table debate, presented some experience of BGKU. She explained that since 2017 in BGKU more than 10 new professional education master program had been opened. One of them is a master program "Management of e-learning in intercultural space. The purpose of this educational program is training of specialists in the field of designing and managing e-learning for multi-age groups in the governmental and non-governmental sectors, educational and scientific institutions.

Objects of study and activity are as follows:

- management of electronic learning in institutions and their subdivisions in the context of uncertainty of conditions and requirements;
- regularities of the modern development of the information society;
- theoretical and methodological approaches to the organization of e-learning, design and use of e-learning environment in educational activities;
- e-learning methods and technologies, learning tools that involve active use of ICT;
- information systems, e-resources and services used in educational activities, processes of their creation;
- processes of designing and creating e-learning environments;
- processes of designing and creating e-learning environments of educational institutions based on different models.

Learning goals and objectives are as follows:

- Formation of professional competencies in the area of designing and managing e-learning for different age groups among graduates of higher education, preparation of graduates for the implementation of educational process in the digital and educational environment with the use of e-learning technologies.

Theoretical content of the subject area includes:

- innovative concepts, technologies and systems of management and development management;
- theoretical and methodological principles of e-learning organization; designing, creating and using an e-learning environment;
- methodology of scientific research.

During two last years we have also opened such new master programs:

- Mathematical modelling,
- Information Systems Security,
- Social Computer Science".

*Prof. Ján Gunčaga, from Faculty of Education, Comenius University in Bratislava, Slovakia* noted that using ICT education has big potential for development in every school subject in every type of school. It has an influence on teacher training at universities. Future teachers need special subjects and courses oriented to the development of their digital competencies. ICT tools have the value of such supporting tools for education. They can help by the development of cognitive abilities of pupils. It is a typical trend in the school classes that in every class there is a group of talented pupils in the use of ICT. It brings the possibility for the teacher to organize collaborative project work for his pupils. Open source educational software is a very helpful tool for organizing this project work.

It is in Slovakian schools at every stage that ICT tools will be implemented in the way to develop mathematical and digital basic skills by pupils and students. It brings the possibility for an interdisciplinary approach, which uses topics from history of mathematics - Euclid, Mathematics and Billiard, place of mathematics in the society. Informatics education can support many programming skills through using programs Scratch, Python and others.

*Prof. Diana Bogdanova from the Russian Academy of Sciences, Russia p*resented her own opinion regarding preparation of new generation specialists in and for the digital world. She said that

It is proposed that learning management system should meet the following requirements:

- Interoperability: supporting integration between different components of the solution.
- Personalization: moving away from a one-size-fits-all approach common in education
- Analytics, advising, and learning assessment: essentially measuring performance and learning for actionable data.
- Collaboration: supporting working together across time and space.
- Accessibility and universal design: including everyone in educational opportunities.

As there is no single application that can provide all these requirements, a “Lego” approach is proposed as a solution. In this way, individuals and institutions will be able to use components to construct learning environments tailored to their goals and objectives. (Boganova, 2011); (Chiappe Laverde; Segovia Cifuentes; Rincon Rodriguez, 2007), (Pithamber R. Polsani, 2003)

*Prof. Olga Yakovleva from HSPU, Russia* reflected on this topic and noted that education should respond flexibly to new demands of an emerging digital society. The determinants of the current changes are global and local legislative trends: strategies for the development of the digital economy in Europe, USA and Asia. In Russia the program of development of the Digital (electronic) economy in the Russian Federation until 2035 was also developed to accompany the Strategy for the development of the information society in Russia (until 2030) and the State program "Development of Education" (until 2020), etc. Now the term “digitalization” is used for the demanded changes in teaching and learning activities.

In this respect, some current Russian research directions are interesting:

- A project is being implemented in Russia that brings together leading universities for the training for the digital economy – “Project 5-100”.
- The Atlas of New Professions was developed that shows the new trends in professions that will appear up to 2025 (http://atlas100.ru/en/).

*Miroslav Hrubý from University of Defence in Brno, the Czech Republic* added his own point of view on this topic, saying that an enormous number of courses have been developed in the recent years. It is the right time to select the best ones in each field and to introduce them on a multi-language level. Adaptation of the chosen high-quality course, which was originally prepared for instance in English, should contain

not only translation into other languages but also enriching its content by a concrete national approach given by native speakers of each national language. An example of such a course is a course concept used in the Net-Trainers Course. This Online Distance Learning Course was aimed to equip tutors with the skills to teach online using modern online technologies. It was offered by the University of West Bohemia from 2005.

Prof. Nataliia Morze stressed that the participants of the debate presented, for example, their national and university initiatives and innovative MA programmes whose main aim, in particular, is to develop competence in the management of e-learning in multicultural environments. The E-learning Academic Association in Poland, as prof. Halina Widła said, organizes two types of examinations every year: for e-teachers and e-methodologists who work in various educational institutions in Poland and after taking their examinations and receiving certificates, they have knowledge, skills in e-learning implementation and formal confirmation of their competences. Prof. Diana Bogdanova emphasized that at the same time, individuals and institutions will be able to use components to construct learning environments tailored to their goals and objectives. Prof. Olga Yakovleva noted that education should respond flexibly to new demands of an emerging digital society. The Atlas of New Professions was developed that shows the new trends in professions that will be published up to 2025. Dr Miroslav Hruby mentioned a necessary adaptation of high-quality courses which are originally prepared for instance in English, into various national language for dissemination in good educational sources.

## 5 INTERNATIONALISATION OF EDUCATION – TRENDS

The topic of internationalization of education was on focuses the experts in different countries and continents. In particular, Haigh (2014) overviewed a multi-layered history from internationalisation to education for global citizenship. Rienties, Beausaert, Grohnert, Niemantsverdriet, Kommers (2012) study the understanding academic performance of international students and the role of ethnicity, academic and social integration. Smyrnova–Trybulska compare and described the internationalization of education in contemporary HEIs, in particular at the University of Silesia in her research (2018a). In Internet age the internationalization of education could be consider also as internationalization of education at home. Nechita, Cojocariu, Păcurari (2014) talked in their research about internationalization of higher education at home, e.g. an initiative for teaching informatics.

*Prof. Halina Widła from US, Poland* notes that the market for online platforms and services continues to evolve and grow. One reason of this phenomenon is knowledge sharing. Information, skills and expertise are being exchanged among people, communities or organizations from different language speaking zones.

She added that she would like to mention the project started in the Quebec Native Training Institute: *Thot Cursus*. Thoth was the Egyptian god of knowledge, inventions, speaking, wisdom, magic and the moon – an inventor of writing and patron of scribes (cf. for example Ancient History Encyclopedia, definition by Joshua J.Mark published on 26 July 2016, go to https://www.ancient.eu/Thoth/). According to Egyptian mythology, he divided time and space and established the standards of measurement which allow us to share the same reality and to agree; hence his role as an arbitrator, a healer, a historian. As Thoth represents knowledge beyond time and space, he was chosen as a symbol and protector of distance learning by French speaking researchers from the francophone project team.

Thot Cursus (available on the Internet site at https://cursus.edu/) is used by French speaking people in Québec, France, Cameroun, Belgium and Switzerland. Dedicated to promoting learning in all its forms, it has been online since 1996. Thot Cursus Inc. began its online activities in 1996 with "Curriculum - International Directory of Francophone Distance Learning", followed in 1997 by "Thot - News from Distance Education". The authors discuss the training and use of digital tools and resources for education and culture in all areas of human activity.

It is worth mentioning that 650 platforms are listed in the Thot Cursus directory. However, despite the degree of utility and usability reached by these platforms, the result of their evaluation shows that each has its own strengths and weaknesses.

Conclusion: it would be a good idea to draw up a list of similar websites discussing the training and use of digital tools and resources for education and culture in all areas of human activity in different speaking zones, with an analytical study of their activities.

Such a guide could be an extremely useful tool for people looking for good quality foreign language materials.

*Prof. Nataliia Morze from BGKU, UA* went on to say that Ukrainian HEIs face a number of challenges in their attempts to internationalize. Their efforts are restricted by a lack of funding and a lack of strategic vision from the government. In most cases, the process is driven by individuals participating in international activities. Moving forward, education programs set up as a result of international partnerships will need consolidation and innovation.

The internationalization of Ukrainian HEIs has been triggered by a number of national reforms, but the responsibility for implementation and quality assurance rests with the institutions. In order to adapt to changing local and global needs and strengthen the quality of research and teaching, Ukrainian universities must make a robust effort to promote internationalization.

*Prof. Ján Gunčaga from Comenius University in Bratislava, Slovakia* remarked that the Internet and many webpages allow for an exchange of educational experiences between teachers, school policy makers and practitioners. Many webpages were created through support of the projects of European Union and economic developed countries. Many aspects of internationalisation are written in the article https://qswownews.com/internationalisation-is-a-global-trend-of-higher-education/.

A good example for exchange of educational experiences in the broad range is the open source software GeoGebra (see https://www.geogebra.org/). The community of users built the network of the national and regional GeoGebra Institus, which organize schooling activities for teachers, workshops and conferences about using of this open source software. The advantage of this software is that it exists in more than 60 language versions.

On the webpage https://www.geogebra.org/materials it is possible to find teaching materials prepared by different users of GeoGebra around the world. These materials are free for downloading and everybody can use or change them for their educational purposes.

There are also many academic portals such www.academia.edu/, https://scholar.google.com/, https://www.researchgate.net/ and others, which allow for an exchange of research ideas of researchers, university teachers from papers, books and other materials. It helps the academic and research community to exchange educational trends in their countries and it supports the development of their common research activities in the field of implementing of new trends in education in every type of school.

*Prof. Diana Bogdanova from RAN, RU* joining the debate, stressed that the development of strategies and approaches to promote, enhance and manage international engagement varies significantly. Russia is enhancing the profile of its universities and supporting them to establish international partnerships to promote innovation and spread of modern methods in teaching and youth work. This effort is known as Project 5-100 (https://en.wikipedia.org/wiki/Project_5-100).

Prof. Olga Yakovleva from HSPU, Russia presented the main trends, which are:

- “Digitalization
- Opening new specialties, creating new professions
- E-learning, smart education

- Interdisciplinary learning content (STEM education)"

In summary, we conclude that internationalisation gives focus to the higher education policy development in the European countries. Through its Erasmus+ and Horizon 2020 programmes, the EU supports international exchanges for students, academic staff and researchers, as well as structured cooperation between higher education institutions and public authorities in different countries. (Internationalisation is a global trend of higher education). One of the good examples of the strengthening of international cooperation between European and non-European countries was the IRNet Project (www.irnet.us.edu.pl) in which more than 40 researchers from 10 universities form 9 countries participated.

## 6 ON-LINE COURSES ASSESSMENT

Assessment activities in massive open on-line courses and e-learning courses in the center of attention of experts, tutors, educators. Some important issues, e.g. state the different implications of the new MOOC paradigm in the assessment process, compare assessment activities in different MOOC platforms; analyze and give solutions for the design of assessment activities for MOOCs; analyze and give solutions about the execution of assessments in MOOCs comprehensive described in Muñoz-Merino, Ruipérez-Valiente, Moreno & Kloos (2015). Smyrnova–Trybulska (2016) analysed the e-learning courses assessment in framework of the comprehensive consideration of E-Learning and Open Education Quality – Some European and National Standards and Regulation.

*Prof. Nataliia Morze*, the expert from Ukraine noted that BGKU has introduced a system for evaluating e-learning courses. It involves the assessment of three groups of indicators: content, methodology and organizational indicators. Course content is estimated by experts from the department, whose specialists developed the course. Two other groups of indicators are evaluated by an independent panel of experts. According to the applicable University Regulations on the certification of electronic courses, each indicator is given a specific score. So, in the evaluation of electronic courses, a maximum score can be 100 points. In order to certify an electronic course and allow it to be used by students the course must receive at least 70 points.

*Prof. Ján Gunčaga, from Comenius University in Bratislava, Slovakia* continued the debate by stating that the key question which should be answered right now is whether learning is a private process.

It should be kept in mind that nowadays students are people of all age groups and their privacy is under protection of various law regulations. One of the latest contributions in this field is the General Data Protection Regulations (GDPR) in the E.U. The problem is that many educational institutions use Learning Managements Systems which enable "spying" on students' activities during their on-line learning without compliance with the contemporary law framework. Students often do not know that their personal data are collected, why this is done, who can access the collected data, how these data will be processed and used in the future."

*Miroslav Hrubý from University of Defence in Brno, CZ* emphasised that many texts have been written about on-line courses assessment. The main stress is almost always given on the question: "How many new facts were introduced by the course?" but the very important contribution of the course is also a possible new outlook on previous knowledge, new sorting of previous known facts. Moreover, it is necessary to distinguish between two views, an expert point of view and a student point of view. The results can be radically different but the voice of a consumer (a student) should not be hidden.

*Prof. Olga Yakovleva from HSPU, Russia* stated her own point of view and described Russian experience, explaining the Project "Modern Digital Educational Environment in the Russian Federation that includes a multi-stage quality assessment of the content of online courses.

The assessment procedure includes expertise from educational organizations, employers, independent public organizations. The major part of assessment is supposed to be done with the help of data mining and big data processing. In particular, the complexity of the tasks is taken into account: for how long and for

how many attempts the students were able to take verification tests; clarity of presentation: how much time the user spent on the development of individual sections of the online course, the number of repetitions of the material; involvement of students in the process: data on attendance of online courses, emotional reactions of students are taken into account. A separate and important indicator characterizing the quality and relevance of an online course is the number of students who successfully completed the training with it.

Next Russian expert *Prof. Diana Bogdanova RAN* commented briefly that organizations and course developers are often hesitant to spend money on course evaluation, not realizing that this is the only way to fully close the course development loop. If one finds a way to integrate evaluation procedures into the training process, they will see that the benefits are huge.

In conclusion, when discussing e-learning and distance learning we should remember, first of all, about the quality of education. As stressed by all the experts, the *on-line courses assessment* should be comprehensives, multistage, taking into account and evaluating various requirements and criteria. Assessment should not only be executed by experts in the area of e-learning and in subjects but also should supported by using, for example, data mining, big data processing and other contemporary IT tools.

## 7 ETHICAL ISSUES AFFECTING THE IMPLEMENTATION OF E-LEARNING

The some ethical issues affecting the implementation of e-learning in a cross-continental-euro-african university was described in study (Silva, Alvarez, Pinto, 2018). Another authors research the awareness of ethical issues when using an e-learning system (AL Mseiedein, Mahasneh, 2020). They study the issues on three ethical categories; Intellectual property rights, vandalism and Privacy and (AL Mseiedein, Mahasneh, 2020) and stressed on their research that “students should be fully knowledgeable about ethical issues to avoid unethical behavior while using of the e-learning system”. (AL Mseiedein, Mahasneh, 2020, p.128)

*Prof. Halina Widła* emphasised that another question is how to organize the didactic process to prevent unethical strategies. In her opinion explaining the rules of intellectual property and teaching students the rules of citation, using materials protected by copyright and discussing consequences of unethical behavior is not efficient enough.

Tutors resort to different strategies to prevent plagiarism: they require photocopies of sources, abstracts for each step of work, specific bibliography containing both online and print sources, they organize exams at the school's headquarters etc.

In her view, the best option is to convince the students not to cheat, by explaining and proving that they simply don’t need it in any university program: traditional or modern. And after one semester of well-conducted classes they can achieve success because they meet all necessary conditions – knowledge and skills to work independently. Lying to oneself is not very satisfying, which is why it is worse than cheating.

*Prof. Ján Gunčaga from Comenius University in Bratislava, Slovakia* stressed that the role of teachers has been definitely changed. The Internet enables information for all people. A self-study with a contemporary network support is not a problem. Teachers are not a central point of education and knowledge now. Teachers are now partners and guides of students. Modern education is a balance between usage of recommendations and individually chosen ways to the fulfilment of study goals.

*Prof. Diana Bogdanova from RAN, RU*, participating in remote mode via Adobe Connect, said that besides issues that have been known and dealt with such as quality assurance, copyright, students identification, there are new issues arising, such as capturing and use students' data. For example, where the data is stored, who owns the data, who has access, how the data is used.

*Prof. Olga Yakovleva from HSPU, Russia* listed some ethical issues:

- “Transformation of the traditional roles of teacher and student
- Change in the ratio of individual and collective

- Development of personal qualities - independence, responsibility

E-learning includes 3 components – technologies, process and people. So there are many issues beyond that. For example, one can name the problems of the surveillance of students (collecting big data and analyzing, who has access to all personal information, etc.); the problems of identity, confidentiality and anonymity.

It can be seen that all the experts stressed that upholding the significance of digital ethics and privacy is becoming very important in the present digital world in the educational process and electronic environments. Various methods, tools, means can be used, in particular: persuasion, teaching and explaining good ethical standards to students; formal requirements and real consequences of non-compliance; the use of special programs, applications, e.g. anti-plagiarism, to verify the originality of students' work. Actions should be comprehensive and consistent. This is the only way to expect visible positive results.

## 8 E-LEARNING IN INCLUSIVE EDUCATION

A researchers and experts from a lot of countries discussed on the issues about e-learning for societal needs in international study (Smyrnova–Trybulska, 2012). E-learning in higher inclusive education: needs, opportunities and limitations, and conditions for the development of e-learning in the inclusive education system in the universities described and analysed by researchers (Meskhi, Ponomareva, Ugnich, 2019). Another experience in using e-learning tools in inclusive educational space of higher school presenting in Alekseeva, Antonenko, Zhadan, Lyfenko (2018).

Experts from different countries presented their experience and reflection on this important topic during debate. *Prof. Maria Potes Barbas* presented her own rich experience and Portuguese experience. She first explained the state of the art, saying that the Instituto Politécnico de Santarém is an institution of public higher education that began its activity in 1979 and consists of the following five Higher Schools in different scientific areas (Agriculture Sciences; Education; Management and Technologies; Sports Sciences; Health) (http://portugalpolytechnics.com/en/polytechnic/instituto-politecnico-de-santarem/). It conducts its teaching courses of the 1st and 2nd cycle, as well as technological specialisation courses (1 year) and post degree courses. It has two halls of residence with laundry and kitchen facilities, wireless Internet access, bar and cafeteria in each school and sporting facilities on all the campuses.

The Higher School of Education (ESES) offers courses of teacher training, communication and multimedia, fine arts, social service and cultural animation, oriented mainly towards the practical and research components that promote reflection, conceptualisation and creation of theoretical frameworks. These are divided into three different categories: initial training (bachelor and master degrees and graduation), teacher's continual and specialised training, namely through post-graduation courses focused on teachers and non-teachers, especially on pedagogical supervision, curricular development and organisation, special education and multimedia education.

Internal System for quality insurance: In 2007, ESES created the Assessment Observatory, which constitutes an infrastructure of support in the field of assessment and evaluation of teaching and learning activities and environmental issues. The purpose of creating this office, at institutional level, comes from the identification of a set of needs, which have become visible through the organisation and systemisation of data for the School's assessment processes; the support for the permanent assessment activity; and the organisation of resources and strategies as a support for the employability and professional integration of students.

The Assessment Observatory's mission in terms of guaranteeing quality covers three main areas: as support for institutional assessment, the accompaniment of employability and professional integration of students in the job market, and the disclosure of complementary information and training in conjunction with ESES's partners and target public.

In order to comply with these objectives the following lines of action were outlined: (i) Scientific and pedagogic activity produced by the lecturers at the School; (ii) (ii) Assessment of the curricular units integrated in the study plans of the respective initial training courses; (iii) satisfaction provided by the services offered by the School; (iv) The ESES students' educational journeys and family contexts; (iv) ESES graduates' journeys of professional integration; Assessment of the employing entities on the training and integration of former students from the School; (v) Develop job-searching strategies in conjunction with ESES students; (vi) Establish a link/contact with ESES students and former students via strategies to disclose job offers and complementary information and training.

Those responsible for implementing the mechanisms for a guarantee of quality are the Pedagogic Council, the Coordinator for ESES Assessment Observatory and the Quality Assessment Commission for the Instituto Politécnico de Santarém. The technique used has essentially been a survey with a questionnaire, and as a complementary technique, documental analysis has been used as well. In parallel, ESES participates in the IPS Assessment and Quality Commission. This commission has developed a set of instruments, which allows the concretisation of the object of assessment, referred to in practice in the Regime Jurídico da Avaliação do Ensino Superior (RJAES), the Portuguese Legal Regime of Assessment in Higher Education.

The Starting Up – Accelerators of entrepreneurship 4 inclusion project is aimed at young people with intellectual and developmental difficulties (IDDs) with a degree of incapacity up to 60%; this group has not had opportunities to continue studies or to enter the labour market (http://startingup4inclusion.ipsantarem.pt/).

In 2018, the first Higher Education course for young people with IDDs (see https://siese.ipsantarem.pt/ese/cursos_geral.FormView?P_CUR_SIGLA=LDMT) started in Portugal (at the Higher School of Education – Polytechnic Institute of Santarém). It was an initiative that mobilized civil society, the business world and the police makers themselves for this problem, and which needs to be further developed, not only in Portugal but in all Europe. In other European countries, other courses and initiatives have been developed for this public, however with low expression in what concerns the insertion in the labour market.

The Portuguese Government recently approved and published a law (law no 4/2019) regarding minimum number of employees with disabilities in companies with more than 75 employees, this law actually comes into force in the month of this project submission (February 2019).

In this way, with non-formal methodologies, it is intended to develop competences in young people with IDDs disorders for insertion in the labour market, both as employees and as self-employed entrepreneurs with innovation and social concern.

This proposal is in line with the National and European challenges. In fact, the relevance of the project is that it matches OECD reports (e.g. OECD, 9 Feb. 2018), in which international experts insist that, while indispensable, the reinforcement of funds and the increased value of practitioners and institutions are not yet contributing consistently to innovation and productivity growth within the priority areas of social and labour inclusion.

In spite of this, some of the priority areas and sectors are still in need of a genuine and adequate analysis, being scarce or lacking in initiatives to include young participants with intellectual disabilities in the labour market.

The project will produce outputs that are innovative for its field, since it presents a unique training system that is specially adapted to students with IDDs and to the youth workers that work with them, a job network platform for enterprises and young graduates adapted to the needs of both employers and employees, and tools to help students to create and organize their CV, portfolios and other materials.

In terms of impact this project is expected to increase the awareness to this problematic and to increase the chances of these young students to enter the labour market. This is especially important, because it demonstrates the lack of attention being paid to young people with disabilities. Therefore, implementing this project will certainly raise the chances of them being more integrated in the society.

It is expected that the project will remain sustainable, assuring that the developed content stays available and accessible long after the funding. Also, by maintaining the job platform network we hope to constantly increase the network of stakeholders (e.g. associations, enterprises, schools) that will keep the project sustainable. Lastly, with this project it is hoped that policy makers will be influenced to create state programs to address this issue.

***Impact:*** The pedagogical, scientific, societal, technological, policy and economic impacts expected at the local, regional and national scope would consist in the fulfilment of our target group needs, but also in a change of behaviours in society (including change of policies).

The project has a methodology that by changing what is close to us (locally and regionally) one could change what is far (nationally and at European level or internationally).

As said before, we aim to enhance the skills of these disadvantaged population and also the ones directly working with them (teachers, youth-workers, families). So the local and regional impact should be a high level of employment for this population that will be reflected in more social inclusion. The integration of a target group with disabilities in society and in the labour market as valued members will have a noticeable impact at all levels that will replicate nationally and at European level with the help of all partners and with a good dissemination and exploitation strategy. The project will be thus collaborating in the solution of one of the major problems and challenges of social inclusion that Europe is facing.

To enhance the various levels of impact, after the several activities execution, we will present to our national and foreign Governments the outcomes, and whenever needed, we will contribute to a shift/reform in policies regarding each country involved.

The project addresses the priorities identified in the Eurozone (e.g. European Parliament; European Commission) like the European Disability Strategy and the need for a more inclusive society. Therefore, this project aims at making a positive difference in the area of the support of young citizens with disabilities.

The exchange of information and good practices will not be restricted to the project partners. Namely in Portugal, the results reached will be used and implemented locally, regionally, and nationally by the coordinator (IPSantarem/ESE) and Portuguese associated partners, and a similar approach will be made by the other partners. Therefore, positive impacts are expected in local, regional and national economy both during the project and after its completion with employability of some of these citizens in the labour market (hopefully others will be employed in other regions and countries of the partners involved).

The action of this network will have a long-lasting impact because the educational contents will remain available and the partners (mainly non-profit organisations) will continue working on social inclusion of these citizens.

We expect National and European impact at various levels: 1. National and European level impacts include (A-D):

A. Pedagogical impact. The application and design of face to face, online and blended learning solutions for this target group - the expected impacts are:

- accurate information of the inclusive aspects that should be taken into account;
- proven models for blending formal and non-formal learning aspects;
- ideas for using ICTs in efficient inclusive learning; - new creative commons generated by network.

B. Scientific Impact. The contribution of research towards the overall aims will be carried according to:

- systematisation and enhancement of knowledge;
- literature review;
- enhancement of competences already developed and creation of new ones; - increased awareness of the disabilities issues;
- context and characteristics of the target group.

C. Societal impact. Through scientific exchanges and activities that will be initiated during the strategic collaboration - the expected impacts will be:

- knowledge and competence in the activation of effective non-formal learning solutions in inclusive contexts;
- long lasting positive effects for the families of the children that are successfully integrated in the labour market, and their local communities (better self-esteem for the elements of the target group; less pressure on their families in terms of worries about their children's future; and better interaction with the community since these young citizens become more autonomous and self-sufficient)
- social inclusion of the at-risk youth in society and future employment market.

D. Policy Impact. Through the previous impacts it is intended to promote necessary reforms and enhance progress in teaching and learning at a variety of institutions:

- Ministries of Education;
- School regulators;
- "Knowledge triangle" of the European Research Area: research, innovation and education.

E. Technological Impact. Through the integration and implementation of adapted and flexible digital platforms. Also in the creation of personalised e-contents, videos and online features like the social media strategy.

F. Economic Impact. Through the introduction of local entities and NGOs enhancing their visibility in the labour market. This will generate not only economic incomes abut also other relevant aspects like competition among other institutions.

*Prof. Diana Bogdanova from RAN*, adding her own comments concerning E-Learning in Inclusive Education, said that according to the UN convention on the rights of persons with disabilities, active participation of persons with disabilities in society is one of the basic human rights. Currently there are many examples of various projects that can be used as examples and inspirations for the new ideas. There is no doubt that it's time to start moving from single examples to everyday life teaching and learning.

It can be seen that the topic *E-Learning in Inclusive Education* is very important in the context of the development of sustainability society and its features. As stressed by prof. Maria Patos Barbas, one of the best experts in this area, a coordinator of several European projects and MA courses, in particular, for young people with IDDs, delivered in Portugal at the Higher School of Education – Polytechnic Institute of Santarém, pedagogical, scientific, societal, technological, policy and economic impacts at local, regional and national level can be expected. Prof. Diana Bogdanova agreed with this opinion and position.

## 9 CONCLUSIONS

"An intelligent society more accurately expresses the intention to improve all aspects of human life, using ICT in new industries. This policy has become a model for the United States - a leader in the online world, as well as for Korea, European countries, Japan and many other countries. An intelligent society is a new

quality of society in which properly serviced equipment, services provided and internet availability lead to qualitative changes in the interaction of the subjects, which allows achieving new effects - social, economic and other benefits. This is the next stage in the development of the so-called information society in which we live today“ (Smyrnova–Trybulska, 2018, p. 440).

The debate shows and confirms that new technologies opens a wide opportunities for all learners and citizens in new global context and digitalization of the world. Simultaneously the role of universities is change. “Universities will rely less and less upon their reputation of ‘centers of excellence’; universities will become laboratories / ateliers for developing youngsters’ talents through special design- and problem-solving tasks, revealing real solutions for real problems. Master students will undertake assignments, experiments, designs and theses, compared to what PhD students achieve nowadays. PhD students will shift towards unique boundary-cutting research instead of performing research that has been prompted by the professor” (Kommers, Smyrnova–Trybulska, Morze, 2018, p. vi).

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# EFFECT OF ENCODING CATEGORICAL DATA ON STUDENT'S ACADEMIC PERFORMANCE USING DATA MINING METHODS

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**ABSTRACT**

Educational data mining (EDM) is the techniques used to discover the knowledge from student's data .it is used to improve the students' performance and teachers' performances as well.

In this paper, we study the effect of encoding some non-ordinal features as one-hot (dummy variables) on the students' performance prediction accuracy. We used techniques form ensemble methods such as Random Forest Trees, Boosting methods specifically namely gradient Boosted trees(GBT), and support vector machines. Also, we compared the performance of Random forest and Gradient boosted trees. We achieve a better result of 81% using random forest classifier. GBT has approximately same performance in all cases. SVM accuracy improved when used dummy variables.

**KEYWORDS**

*E-learning, Educational Data Mining, Student performance, Support Vector machine, Random Forest*

## 1 INTRODUCTION

Educational Data Mining (EDM) is an emerging discipline. It is concerned with developing methods for exploring the unique types of data coming from educational settings and using those methods for better understanding students and the settings which they learn in (Ayesha et al., 2010). It can help the educators to improve teaching methods, to understand learners, to improve learning process, and to improve the learning activities of the learner. Also, EDM helps the administrator to produce good quality outcomes. web-based education, educational repositories and traditional surveys are the resources for collecting educational data, EDM uses various techniques of data mining, machine learning and statistics to analyze and extract the hidden knowledge form educational data context.

The main goal of this article is to study the effect of encoding non ordinal categorical features on the accuracy of predication models. We use the educational dataset of that is collected from learning management system (LMS) called Kalboard 360(Amrieh, Hamtini and Aljarah, 2016). Then we apply data mining techniques, namely, Radom Forest, Gradient Boosted trees, and support vector machines. We do

not apply feature section methods to figure out the accuracy without performing any selection or reduction. Instead, we applied feature encoding methods like dummy variables to make the model understand data and perform efficiently. The results show that there is improvement in the models' performances using GBT and SVM, though GBT slightly improve the prediction accuracy. SVM achieves 7% accuracy improvement over numerical features.

## 2 LITERATURE REVIEW

Much Research has been carried out to demonstrate how important data mining techniques in education, demonstrating that this is a new idea to extract valid and accurate information about the behavior and efficiency in the learning process (Ramaswami and Bhaskaran, 2010) .

Data mining has been utilized to analyze the curriculum and subject of the present research topics in addition to analyzing students' performance. Researchers have investigated in EDM. For instance, (Harwati, Alfiani and Wulandari, 2015) use naïve base algorithm to predict student performance based on 13 variables. Based on the results, a model was built for the purpose of predefining the students who are at risk of failure and thus activating a guidance and counseling program. k-means algorithm was used by Varun and Chadha (2011) to cluster students based on five behavioral features like papers' scores average and seminar notes. According to the results, there was a strong relation between attendance and student performance. Varghese et.al (2010) claim that knowledge through analysis by data mining can improve student performance, organizations management, and the education system in orientation. Another research was conducted on the education system in Portugal (Cortez and Silva, 2008), and the research's results presented a good and precise prediction. This was done by development tools which helped improve the management of education in schools and the effectiveness of learning, which was a significant return.

## 3 DATA SET

The data set was collected by using a learner activity tracker tool, which called experience API (xAPI). The purposed was to monitor the behaviors of students to evaluate the features that may impact the student performance (Amrieh, Hamtini and Aljarah, 2015).

The dataset includes 480 student records and 16 features. The features are classified into three categories: (a) Demographic features such as nationality, gender, place of birth, and relation (parent responsible for student, i.e father or mum). (b) Academic background features such as educational stage, grade Level section id, semester, topic, and student absence days . (c) Behavioral features such as raised hand on class, visited resources, answering survey by parents, and school satisfaction. The dataset features are explained below:

**Table 1** Features descriptions

| Feature | Explanation |
|---|---|
| 1- Gender | student's gender (nominal: 'Male' or 'Female') |
| 2- Nationality | student's nationality (nominal:' Kuwait',' Lebanon',' Egypt',' SaudiArabia',' USA',' Jordan',' Venezuela',' Iran',' Tunis',' Morocco',' Syria',' Palestine',' Iraq',' Lybia') |
| 3- Place of birth | student's Place of birth (nominal:' Kuwait',' Lebanon',' Egypt',' SaudiArabia',' USA',' Jordan',' Venezuela',' Iran',' Tunis',' Morocco',' Syria',' Palestine',' Iraq',' Lybia') |
| 4- Educational Stages | educational level the student belongs (nominal: 'lowerlevel','MiddleSchool','HighSchool') |

| | |
|---|---|
| 5- Grade Levels | grade student belongs (nominal: ‘G-01’, ‘G-02’, ‘G-03’, ‘G-04’, ‘G-05’, ‘G-06’, ‘G-07’, ‘G-08’, ‘G-09’, ‘G-10’, ‘G-11’, ‘G-12 ‘) |
| 6- Section ID | classroom student belongs (nominal:’A’,’B’,’C’) |
| 7- Topic | course topic (nominal:’ English’,’ Spanish’, ‘French’,’ Arabic’,’ IT’,’ Math’,’ Chemistry’, ‘Biology’, ‘Science’,’ History’,’ Quran’,’ Geology’) |
| 8- Semester | school year semester (nominal:’ First’,’ Second’) |
| 9- Relation | Parent responsible for student (nominal:’mom’,’father’) |
| 10- Raised hand | how many times the student raises his/her hand on classroom (numeric:0-100) |
| 11- Visited resources | how many times the student visits a course content(numeric:0-100) |
| 12- Viewing announcements | how many times the student checks the new announcements(numeric:0-100) |
| 13- Discussion groups | how many times the student participate on discussion groups (numeric:0-100) |
| 14- Parent Answering Survey | parent answered the surveys which are provided from school or not (nominal:’Yes’,’No’) |
| 15- Parent School Satisfaction | the Degree of parent satisfaction from school(nominal:’Yes’,’No’) |
| 16- Student Absence Days | the number of absence days for each student (nominal: above-7, under-7) |

The follwoing figures show the topic, nationality, and class distribustions.

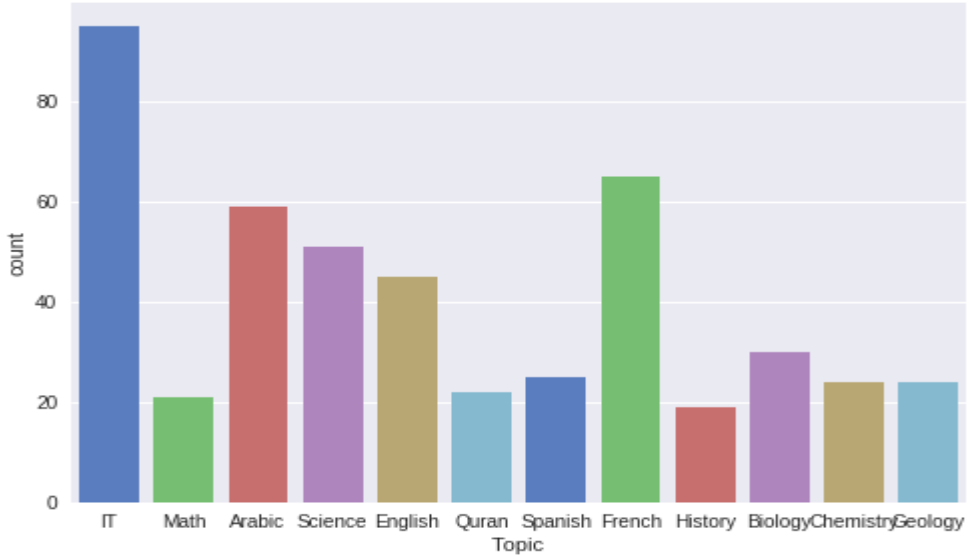


**Figure 1** Topic visualization.

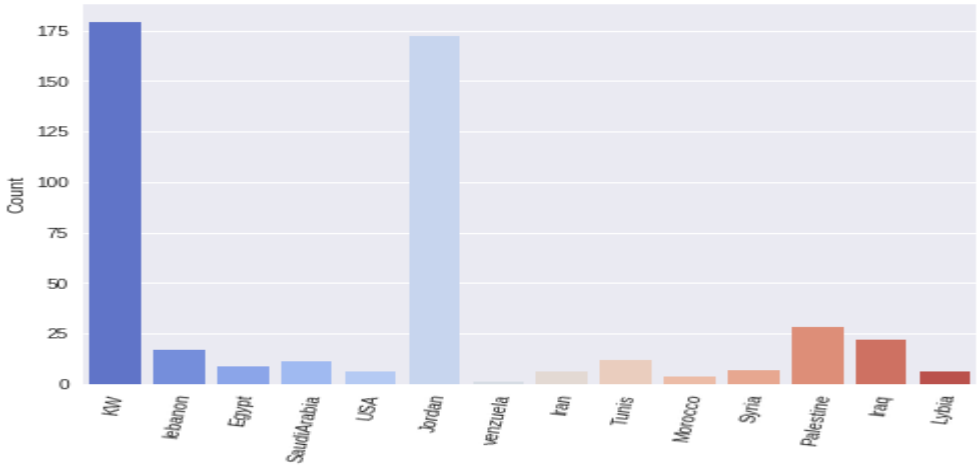


**Figure 1** Nationality visualization.

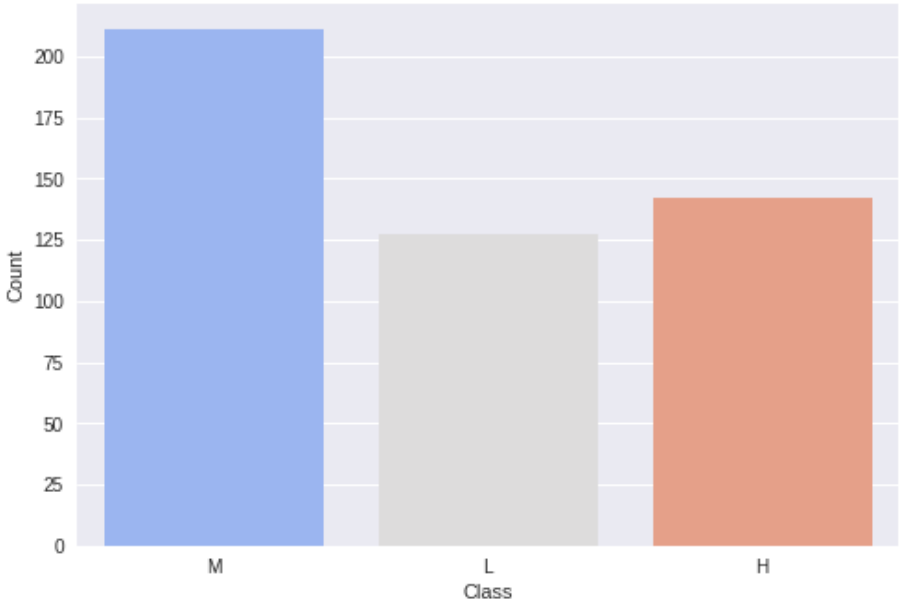


**Figure 2** Class visualization.

## 4 MERTHODOLOGY

The research question was, does using dummy variables instead of numerical improve and affect the performance? since some features, like country, does not have an order, so they will be misunderstood by the model if encoded as numerical. Therefore, we want to explore the encoding effect on the performance. we expect the dummy variable encoding where there is no order in data values improves the prediction accuracy. Hence, we use python get_dummies to obtain dummy variables for categorical variables set. Also, we map the other categorical features that carry order like class to H:2, M:1, and L:0.

We used random forest and gradient boosted trees models for prediction. RF and GBT are ensemble learning methods. They combine the individual trees to obtain predictive results for regression or classification.

Ensemble methods are further categorized as dependent and independent. GBT is an example of dependent methods. RF is an independent ensemble method the combines the output of individual independent learners through voting process.

Also, we use support vector machine (SVM). It performs classification by finding the hyperplane which maximizes the margin between the two classes (binary classification). Multi-class SVMs (MCSVM) are usually implemented by combining several binary SVMs (Chamasemani and Singh, 2011). We have 3 classes, so we utilize multi class prediction models

## 5 EXPERIMENTS AND RESULTS

The study was divided into three parts:

In first part, we encoded all features as numerical as used in the original paper, we further divided and compared the models' performances with using behavioral features and without using the behavioral features. Then, we applied Gradient Random forest and boosted trees using cross validation.

First, we started by comparing the importance of behavioral features (Bf) and impact of the predication accuracy as shown in the following table.

**Table 2** RF vs GBT with and without behavioral features

| Evaluation measure | Random Forest | | Gradient boosted trees | |
|---|---|---|---|---|
| Bf existence | Bf | WBF | Bf | WBF |
| Accuracy | 81.04 | 75.00 | 77.29 | 73.12 |
| Recall | 81.56 | 75.45 | 77.82 | 74.19 |
| Precision | 82.45 | 76.32 | 78.74 | 74.10 |
| F-Measure | 82.00 | 75.88 | 78.28 | 74.14 |

Table 2 shows better results in all cases by using random forest model with behavioral features and without behavioral features. These results are better than results of (Amrieh et al., 2016). Amrieh et al (2016) used decision tree(J48), artificial neural network, and naïve base. They got best accuracy score by ANN WITH 79.1 for BF and 57.0 without behavioral features with only 10 features by using ensemble method. We considered all the features; we did not apply feature selection as they did. Therefore, using behavioral features improved the prediction performance of both models. Now on, we compare between models using behavioral features.

In second part, we used one-hot encoder for the categorical features mentioned above. Random forest (RF) and gradient boosted tree (GBT) are applied. The achieved results are below:

**Table 2** RF and GBT results using demographical features as dummy varaibels.

| Evaluation measure | Demographical features Binary encoded | |
|---|---|---|
| Bf existence | BF-RF | BF-GBT |
| Accuracy | 80.00 | 77.92 |
| Recall | 80.19 | 78.43 |
| Precision | 82.04 | 79.49 |
| F-Measure | 81.10 | 78.96 |

From the table, RF is still the best model in accuracy. we achieved 80% accuracy that is 1% less than encoding all features as numerical. However, GBT achieved a slightly better accuracy with 77.92 compared to 77.29.

In third part, we used one-hot encoder for the categorical features and topic feature. Random forest (RF) and gradient boosted tree (GBT) are applied. The achieved results are below:

| Evaluation measure | Demographical features and topic Binary encoded | |
|---|---|---|
| Bf existence | BF-RF | BF-GBT |
| Accuracy | 78.33 | 77.92 |
| Recall | 77.97 | 78.46 |
| Precision | 80.71 | 79.41 |
| F-Measure | 79.32 | 78.93 |

Table 3 Demographical and Topic encoded as dummy variables

As show in the table, RF scored 78.33 that is less than other previous methods. However, GBT gives same accuracy compared to the previous table (only categorical features).

We also use support vector machine classifier with linear kernel. Here, we arbitrarily used test split for splitting dataset into 80% training set and 20% testing set. We recorded better results with dummy variables as show in the following figure:

| Evaluation measure | SVM | | |
|---|---|---|---|
| Bf existence | All numercal features | Categorical features as dummy variables | Categorical and topic features as dummy variables |
| Accuracy | 0.7 | 0.74 | 0.77 |
| Recall | 0.71 | 0.75 | 0.77 |
| Precision | 0.7 | 0.74 | 0.78 |
| F-Measure | 0.71 | 0.75 | 0.78 |

Table 4 SVM with categorical and topic as dummy variables

Dummy variables encoding has a noticeable impact as shown in table 4. SVM has better accuracy when encoded categorical in addition to topic features. This model supports out hypothesis.

## CONCLUSION

This paper proposes a students' performance prediction model based on trees classifiers (Gradient Boosted trees and random forests). The dataset is provided by (Amrieh, Hamtini and Aljarah, 2016). Also, it is published on Kaggle by the author. This paper achieves better accuracy compared to the original paper by 2% . It compares the performance accuracy when encoding nonordinal features as dummy variables, and when encoding the same features as numerical variables. RF decreased 1% by encoding categorical variables as dummy. GBT has a slight increase in the accuracy by using dummy variables. SVM accuracy increases 7% by encoding nonordinal categorical variables. Therefore, encoding categorical variables affects the prediction accuracy.

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# REFLECTIONS ON DISTANCE LEARNING WHEN TEACHING ENGLISH PRIMARY SCHOOL CHILDREN, CHILDREN WITH SPECIAL EDUCATIONAL NEEDS AND ADULT LEARNERS AT LANGUAGE SCHOOL DURING COVID-19 PANDEMIC

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**ABSTRACT**

The COVID-19 outbreak has undoubtedly caused one of the greatest disruptions to education witnessed in recent history. In an attempt to ensure the educational continuity, many governments, including Slovakia, have quickly transitioned from traditional face-to-face instruction to distance learning. The paper deals with current issue of COVID-19 pandemic using information and communication technologies for English language distance learning of primary school children, children with special educational needs and adult learners at language schools. First, the instructions on how to proceed in the distance education of primary school children provided by the Ministry of Education are described and a practical overview at the advantages and disadvantages of online lessons, applications and programs is introduced. Second, the challenges of distance learning when teaching English children with special educational needs are also analysed. In order to gain a complex view on the research topic, adult learners´ subjective experience on English language distance learning within language school is introduced in the third part of the paper.

**KEYWORDS**

*English language, distance learning, primary school children, children with special educational needs, adult learners*

## 1 INTRODUCTION

Education of nowadays puts emphasize on creative and modern ways of teaching and learning English, using electronic devices, such as computers, tablets and other multimedia programs or applications, commonly referred to as information and communication technologies. However, it needs to be stressed that their impact was always rather considered within conventional, face-to-face language classes. In the time of worldwide spread COVID-19 pandemic, all the schools in Slovakia were forced to change the way of teaching and learning, and, the integration of information and communication technologies has become crucial during this period for transmitting learning processes directly to learners´ homes in order to continue teaching and learning process. As the result, it is important to evaluate challenges that go in a hand with

their use for English language distance learning of primary school children, children with special educational needs and adult learners at language school.

## 2 THEORETICAL PART

## ENGLISH LANGUAGE DISTANCE LEARNING OF PRIMARY SCHOOL CHILDREN

Slovak education was most affected by the first wave of COVID-19 in the period from March to June 2020, when all schools were closed. During this period many schools were forced to set certain rules, which were familiar to students and parents. The primary goal was to help students to continue their education. At the same time, the effort to take into account the current challenging situation fully dominated, and therefore uniform rules were set in many Slovak schools (Galeje).

The distance form of education of school pupils took place through electronic communication with pedagogical staff of the school in the following forms:

- through the educational portal EduPage,
- through social networks,
- through e-mail communication,
- using applications, e.g. Google Classroom, Zoom, Microsoft Teams, etc. (at the discretion of individual teachers).

Pupils followed the timetable and processed the tasks assigned by the teacher according to the schedule determined by the teacher. They were prepared in the form of self-study according to the submitted materials and other sources. The student or parent informed his class teacher about incapacity for work and other reasons that prevented the student from participating in distance education.

To make the teaching process work mutually, each school issued guidelines for teachers on the distance form of education during the lockdown. Teachers of individual subjects gave students assignments (approximately according to the valid timetable) in a reasonable scope and difficulty with the determination of the exact date for study / elaboration:

- new self-study curriculum (e.g. study texts, presentations, ...),
- assignments to practice the curriculum (worksheets, supplements, ...),
- assignments to verify the understanding of the curriculum (tests, checks, ...),
- projects for independent work.

One of the basic findings from March-June 2020 is that there was no one optimal solution for distance education, but the needs were different and very well-functioning solutions in one school might be unusable in another school. No one who was part of the school community could know what measures might work well in a particular school and which ones would not. Therefore, it was best for school management to adapt the measures proposed at national level to the conditions of their particular school. Therefore, Minedu (the Ministry of Education, 2020) has prepared a manual in the form of a structured list of questions, possible answers, and examples of solutions that the school could use in preparing its own plan.

Does the student have access to the Internet at home?
Does the student have a device on which to work with electronically assigned tasks?
Does the student have the necessary skills to work with electronic devices and software?
Is the student able to work with assignments without the direct and continuous support of an adult?
Does the student have access to the printer?

Does the student have a telephone connection?
Does the student have space and conditions for concentrated work at home?

Especially when working with children in the first stage of primary school, the work is more demanding, as their knowledge of the use of ICT, applications and various programs is less than that of older students. Many students had trouble adding an attachment to the email or did not understand the task and therefore required frequent adult help. When learners suddenly stopped responding or when their performance declined, these could be signs of affective disruption. Pupils who did not understand the tasks or felt they lacked the skills or resources to complete, could try to avoid the task (Madjar et al., 2011). Due to this fact the most suitable option for teaching and learning effectively from home was to organize an online lesson (video call).

Today´s software offers enough applications or programs that are available for free and allow not only video calls of multiple participants at once, but also sharing materials, attachments, or pictures during the call. ZOOM has become such an application, which has started to be used by an enormous number of teachers and students in Slovakia. Of course, the help of parents or older siblings was needed here as well, given that the installation was in English and that it caused difficulties for almost all children in the first grade. Disadvantages also occurred in the teaching and learning process, namely an intermittent signal, one computer in the household, simultaneous online lessons of several household members, Internet outage. Despite these facts, however, the online lesson was appreciated by both students and parents.

## ENGLISH LANGUAGE DISTANCE LEARNING OF CHILDREN WITH SPECIAL EDUCATIONAL NEEDS

Foreign language education of learners with special educational needs (SEN) is one of the language pedagogy fields which constantly demands more attention from researchers since the number of children with various diagnoses, for instance Dyslexia, Dysgraphia, Dysorthographia, Attention Deficit Disorders (ADD), Attention hyperactivity disorders (ADHD) and Autistic Spectrum Disorders (ASDs) that are integrated into mainstream schools.

According to the Act 245/2008, §2 of the Slovak Republic, children in mainstream education are classified into following categories:

- **Mainstream learners** are learners without any learning disabilities, behaviour and attention disorders, health impairments or social exclusion.
- **A learner with special educational needs** (SEN) is a learner who has been diagnosed as a SEN, who requires modifications of content, forms, methods, and approaches to the educational process that arise from the health status, learning disabilities, or socially disadvantaged environment in which the learner lives.

Based on the last official statistics from the USA released in 2014, currently one in 59 children suffers from ASD, which corresponds to a 250% increase in the number of cases since 2000 (Data & Statistics on Autism Spectrum Disorder, 2019). According to European Union officials, the prevalence in Europe has also grown rapidly, and is currently estimated to be 1 in 89 children (Autism Spectrum Disorders in the European Union). For example, the United States has seven million children between 3–21 years of age who have been receiving special education classes at school (National Center for Education Statistics, 2020). The research made by Starcic (2014) concluded inclusion level of the children with learning disabilities into mainstream schools in the United Kingdom was 28.81 %. In comparison to Slovakia,

according to official statistics of Ministry of the Education, Science, Research and Sport of the Slovak Republic, there are about 10 % of special education children at primary schools in the country (Ministry of Education). As the numbers show, there are a lot of SEN learners not only in Slovakia also worldwide who have been affected by CORONA crisis.

While being at school, the education of students with SEN is carried out in accordance with the applicable legislation of Ministry of Education, which was described in above mentioned paragraph. As the guideline fully specifies, teachers need professional advice from psychologists and special education pedagogists who prepare the tailored individualised educational programme and provide recommendations on compensational aids (Kormos and Smith, 2012). As a tool of accommodation of SEN, the electronic devices, for instance, laptops, iPads, smart phones are recommended during the lessons. The educational standards for SEN are the same as for the neurotypical students, only with one difference that their schooling is accomplished with accommodation specified in the Individual Educational Plan. However, SEN learners face a lot of challenges derived from their diagnosis. All above mentioned could be applicable for teaching SEN in school setting. However, SEN learners have to face the abrupt change caused by COVID-19 that has an impact on mental health of children with disabilities because it shifted them to online word without professional help. Commonly termed as social distancing has led to a lack of daily routine and structure, and therefore causing real struggle for children having SEN (Bartlett et al., 2020).

**Kormos and Smith (2012) summarised the challenges of SEN students in regard to foreign language acquisition into following points:**

- a learner has a disability in one or more basic psychological processes, mainly mental processes, for instance memory, seeing and hearing perception and way of thinking,
- a learner has a difficulty in learning, mainly in speaking, listening, writing, and reading,
- a learner has obstacles between a learner´s abilities and a low level of performance.

Commonly known feature of SEN learners is their low adaptability and flexibility, be more specific, sudden changes cause SEN learner panic. These children enjoy prepared activities, routine, pre-arranged scenarios because predictable activities help them overcome anxiety and lessen their frustration (Van Eylen, 2011).

While online classes seem to be favourable for most students, little is known about its psychological impact on SEN learners. A lack of routine and the attached uncertainty can make children with Autism Spectrum Disorder feel more anxious and depressed because they need routine and planned activities. Tandon (2020), in their work has pointed out the relation between COVID-19 and psychiatry, and vice versa. Experiencing negative emotions, changes in moods, and changes in the sleeping and eating patterns of children put them at a greater risk of experiencing worsening mental health issues. Shifting classes online leads to more burden to their parents that often replace teachers and professionals with insufficient help. Parents have to manage SEN learners time, do online homework task that levels their stress and frustration and thus negatively affect their children. As an immediate remedy, guidelines by UNICEF providing resources on children with disability during COVID-19 can be effectively followed (UNICEF, 2020).

Finally, we ought to mention the huge group of SEN leaners in Slovakia, despite not suffering from any diagnosis, who are educated in the form of inclusion because they come from socially disadvantaged environment. Some disadvantages of online education were pointed out by the Institute of Educational Policy with cooperation the National Institute of Certified Measurements of Education at Primary and Secondary Schools conducted a survey which found that up to 52,000 pupils in Slovakia did not participate

in online education during COVID-19. The reason for this failure was either a connection problem or a missing technique. This group mostly included students from socially disadvantaged backgrounds (Sme.sk).

## Research methodology

We used the interview as a research method to find out the biggest issue which facing the SEN learners during CORONA crisis.

Our research sample included seven SEN learners, having diagnosis included in Table 1, for example: Asperger syndrome, ADHD, ADD, Dyslexia, Dysorthographia and Dysgraphia.

**Table 1: Research sample**

| Name | Age | Diagnoses | Recommendations according to IEP on tests |
|---|---|---|---|
| Rudko | 12 | Asperger syndrome | Short test with Yes/No answer, multiply choice, prolonged time for testing, in his bad days to prefer oral exams, prolonged time for testing |
| Roman | 11 | ADD, Dysortographia | Prolonged time for testing, accept spelling mistakes |
| Filip | 10 | ADHD | Prolonged time for testing, demand only basic knowledge |
| Peter | 11 | Dyslexia, Dysortographia, Dysgraphia | Prefer oral to written tests, accept spelling mistakes |
| Matej | 11 | ADD, Dysgraphia | Prolonged time for testing |
| Alex | 13 | Dysortographia | Accept grammar mistakes |
| Evelyn | 10 | Dysgraphia, Dysortographia | Prolonged time for testing, accept spelling mistakes in writing |

Parents provided us the Individualized Educational Programmes of their children and we scrutinised only recommendations for teaching a foreign language. As the table shows, prolonged time for testing, acceptation of spelling or grammar mistakes are frequently advice to meet their needs. Parents of SEN students of our research sample answered the following questions:
Interview question:

1. Name the issues in distance learning of your child?

2. What impact does the distance learning have on your child behaviour?

3. What do you have to do to help your child?

Interview questions were processed by quantitative analysis - Inductive Content Analysis of Coding and summarised in the tables below.

**Table 2: Distance learning issues from parents' point of view**

| Distance learning issues |
|---|
| time management |
| tendency to spend more time on computer |
| social insulation |
| lack of routine |
| lack of specialist's consultations |

| |
|---|
| missing peers |
| behavioural issues |

Parents reported that they used to face above mentioned issues of their children before CORONA pandemics, however, distance learning increased the level of those issues. The biggest problem parents see the loss of daily routine and lack of consultations with psychologist and special pedagogists who provide therapies to their children.

**Table 3: Child behavioural issues in distance learning issues from parents' point of view**

| **Child behavioural issues** |
|---|
| anxiety |
| frequent tantrums |
| bad mood |
| depression |
| overwhelming |
| frequent distractions |
| refusal doing homework |

According to parents, distance learning of their SEN children led to more frequent behavioural problems, for instance anxiety, tantrums, frustration, refusal to do homework, bad mood and even though in some cases suffering from depression.

**Table 4: Parents help to their children in distance learning**

| **Parents have to help** |
|---|
| to check homework assignment |
| to write down notes |
| to help with project tasks |
| to search the information |
| to be physically present on online lessons |
| to schedule daily tasks |
| to follow teacher´s instructions |

Parents feel that they have more duties than before CORONA pandemics. Despite the fact they used to help their children with learning and doing homework. For example, parents have to supply teacher´s assistant to follow assignment and activities during online lesson. To better understand the subject, they are often present on online lessons with their children.

To sum up, the distance learning of SEN learners is not so beneficial for SEN learners in comparison to other groups of learners. The loss of the routine and lack of services lead to worsening the behaviour of

SEN learners. Most of SEN learners reported that they would like to return to school because they do not want to do so much homework. Parents reported that they feel overwhelmed and frustrated to be a parent and an educator at the same time. In addition, they feel exhausted from constant care of their children. They feel guilty because their well-being is directly connected to worsening their child behavioural issues. To prevent the tantrum, they do not force their children to do every school homework and accept the worsening the marks.

## ENGLISH LANGUAGE DISTANCE LEARNING OF ADULT LEARNERS AT LANGUAGE SCHOOL

The massive transmission of learning processes from conventional to fully remote language classes, using the information and communication technologies, has affected also non-formal educational institutions such as language schools. Besides other differences, it needs to be stressed that while within formal education, learners often belong to the same age group, non-formal educational institutions usually include learners of all age groups, including the adult ones. In the previous part, numerous challenges of English language distance learning of primary school children and children with special educational needs were introduced. In the following part, we are rather interested in the challenges of English language distance learning that the adult learners attending language school must face to. Being able to analyse their perception, five adult English learners (from 45 to 63 years old) at B2 level, were addressed to write down their thoughts in a form of diary during the first wave of COVID-19 in the period from March to June 2020.

First, majority of them reported technological issues as a major challenge. While using information and communication technologies within face-to-face classes increases their motivation and engagement, their implementation for English language distance learning decreases it due to the fact that they have to face to numerous technological problems, as it was reported in the learner´s diary: *„It is motivational to use information and communication technologies within standard conditions of language classes, however, now I perceive them rather as a tool for connection with the teacher, and not as the tool for learning English“* or *„In my opinion, I spend too much time dealing with technological failures when trying to connect and this time could be spend by learning English“.* Overall, while for young learners, who are commonly referred to as digital natives, it might be natural to solve technological issues by themselves, some of the adult learners may feel like they do not have the expertise or abilities to participate in English language distance learning and, as the result, their learning experience becomes negative. In addition, one of the learner pointed also the change in the use of information and communication technologies, when stated: *„Actually, I use my smart phone and laptop just for joining online classes where I follow only my coursebook, and not for learning English as I was used to before, this is quite boring“.* This opinion might refer to the fact that while using information and communication technologies has already become natural part of face-to-face classes, their implementation for English language distance learning is not that common.

Second, learners stressed in their diaries that it is difficult to maintain intrinsic motivation for English language distance learning, especially due to the loss of goal setting and progress monitoring. According to their notes, they would appreciate if the teacher would pay more attention to setting clear goals and providing feedback about their progress, otherwise they are rapidly losing their motivation. Overall, students felt that when they are learning English remotely, they require more expert guidance, in this case from a language teacher who could be perceived as an advisor that helps them to achieve increased autonomy by making them aware of the learning process, their own learning styles, strategies and attitudes. Undoubtedly, the immediate shift from conventional to fully virtual learning due to the COVID-19

pandemic has caused that self-directed learning could be considered as a crucial skill for remote language learning. Based on our experience, some learners found it motivating to direct their learning, supported by learner´s experience, when noted: *"Before school closure, I limited my English learning to time blocks of 60 minutes per week, waiting for what teacher is going to teach me within class, and, nowadays, I am learning English in accordance with my own interests I have set for myself and teacher is helping me to achieve these goals"*. On the other hand, some of them would have preferred more coordination and assignments to give their language learning direction, as stated: *"I am missing more guidance from my language teacher because I struggle to keep myself motivated and focused when I am learning English alone"*. It could be also assumed that the teacher should not forget to positively appreciate students during online learning through awards, certificates, points and to give them motivation, support and guidance they need to achieve the desired outcomes.

Third, language development is undoubtedly a social construct that requires peer interaction that might be also underestimated in context of COVID-19 pandemic. When language is processed, our understanding is simultaneously framed from the context of the conversation and the body language of the person with whom we are speaking. However, body language can be also missing in online language learning, what was also confirmed in learner´s diary: *"I prefer classroom learning over virtual classes because my English develops much more in daily interactions with teacher and peers, as I do not feel self-confident to speak online, sometimes even without the possibility to see each other"*. This means that learners have to use a lot of extra attention, effort, and energy in order to contextualize and fully understand peer´s interaction via video chat. In English language distance learning, learners reported that they have become exhausted by the effort of trying to interact with others through artificial medium that blocks many of the natural cues we use to understand language and emotions.

## CONCLUSION

Currently, there is a huge pressure on the informatization of education. It was the pandemic situation that occurred and persists that it has brought new challenges to teaching and learning for teachers, students and families. (Reimers et al., 2020).

The aim of the paper was to provide an overview of the advantages and disadvantages of distance education of primary school children, special needs children and language school students, and to consider the possibilities of online teaching for a specific category of students based on the recommendations of the Ministry of Education, learners and parents´ reports.

Learners of the stages mentioned above have enriched and increased their knowledge of using new online programs and applications, and, according to Carter et al. (2020), there may be other elements important to young learners that have yet to be discovered, especially in models that take into account differences in cognition and motivation in the presence of advanced technologies.

Although the pandemic hit most schools unprepared and led to a significant disruption of the normal teaching process, the level of modern education has moved forward on the recommendations of the Ministry of Education, digitization, prompt response and the initiative of teachers, pupils and their parents.

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