MODERN APPROACHES IN EDUCATION

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Abstract. The article deals with the usage a modern approach to education, it is possible to support the achievement of the objectives of the Bologna process of modernizing the European Union in order to improve the quality and extend the reach of education throughout Europe. New and evolving approaches to learning and teaching that enable modern technologies are described by the author. In the article digital technology as a common part of all areas of life is investigated. It is therefore essential, within the framework of the educational process, to ensure their implementation through appropriate educational platforms. According to the article teaching supported by interactive technology encourages the active learning of pupils and leads to their mutual cooperation. The article touches upon the issue of the educational platform is usually defined in a general sense as the core technology on which other technologies or processes are built.

Keywords: *modern approach, learning, teaching, educational process, interactive technology, e-learning, educational platform.*

Introduction

At present, significant changes due to the entry of technological innovation are indicated for education. The changes involve the teaching method and their perception by the pupils themselves. Given the trend in technology development within education, not only the teachers but also the students must be prepared for the active and creative use of new information and communication technologies. These can be used to improve quality and improve education and learning, as they can be better tailored to the needs of individual pupils and students therefore providing faster feedback. Using a modern approach to education, it is possible to support the achievement of the objectives of the Bologna process of modernizing the European Union in order to improve the quality and extend the reach of education throughout Europe.

Research results.

The main objective of the current school reform is to provide quality, relevant and widely available education resulting from the labour market requirements. The change of traditional teaching to modern teaching, in which the pupil is an active subject and the teacher as the manager of the educational process, oversees the preparation and operation of the school. The changes also involve the selection of learning strategies, the correct application of modern information and communication technologies, which is very advantageous in teaching today. New and evolving approaches to learning and teaching that enable modern technologies can complement, strengthen, support and further develop the desired reform objectives (Domborovska, 2018).

Information and Communication Technologies (ICT) have become a common part of our daily lives. It is very difficult to imagine existence without them. Continuous development is bringing about changes in education, where interactive technologies are intended to substantially modernize learning processes and are becoming increasingly popular. This is proven by the growing number of multimedia classrooms, virtual classes, digital libraries, e-books and devices in schools. Working in these classes, as well as the techniques and equipment used, puts

increasing demands on the work of a teacher who must constantly develop his skills, professional competences, work on himself and become a lifelong student (Brečka, 2018).

In April 2013, the Ministry of Education of the Slovak Republic approved the "The concept of computerizing the education sector by 2020 - Digipedia 2020". The main aim of this program is to provide pupils, teachers and parents with a modern way of education that corresponds to world trends. In general, it is a program for digitizing education, which sets out the frameworks, priorities and objectives that Slovakia should gradually reach in the use of ICT in education. Several national projects have already participated in implementing the program's objectives, which include providing school digital technologies, such as Infographics, Planet of Knowledge, Modern Education, Digishkola etc.

Their main objectives included:

- transforming traditional education to modern education, in which the educational process of learning focuses on active learning and developing the pupils' creative abilities,
- changing the content of teacher education and training and educational methods,
- developing the computer and information literacy of pupils and teachers,
- building a schools' hardware infrastructure (schools were equipped with computers, laptops, interactive whiteboards, etc.),
- ensuring access to the digital content of education,
- establishing the Central Information Portal of the Ministry of Education iEDU (departmental communication structure for communication and information sharing between schools),
- intensive digitization of learning content.

Today's pupils accept digital technology as a common part of all areas of life. It is therefore essential, within the framework of the educational process, to ensure their implementation through appropriate educational platforms.

Interactive learning systems. Teaching supported by interactive technology encourages the active learning of pupils and leads to their mutual cooperation. However, even in this environment, it is necessary to start from the basic principles of learning that are:

(a) *Active learning* - learning requires active and constructive student engagement. In the process of upbringing and education, it is important that the student is careful, understands and actively participates in the process to achieve the set goal. Without the active involvement of the pupil these cognitive activities cannot be accomplished.

(b) *Social participation* - education and training are primarily social activities and lead to participation in the social life in the school environment. The theory of social constructivism points out that the pupil learns in the progressive internalization of the individual characteristics of the group in which he grows up. An important part of the educational process is a cooperative atmosphere in which the pupil is more committed to developing his / her role as the most ideal because he / she is aware that his / her results will be compared with those of other learners.

(c) *Meaningful activities* - pupils are best taught by participating in activities that make sense and are usable in real life, for example, when they solve problems in situations, they encounter in everyday life that are close or familiar to them (Hosoff, 2018).

The right use of interactive technology in the learning process based on adhering to these principles encourages active learning, i.e. acquiring new knowledge of active and creative activities, thus better shaping the ability to use knowledge in practice. Social cooperation with other children and the use of practical activities that reflect the pupils' appetite for learning are also encouraged because learning seems to be meaningful (Kabatova, 2013).

Interactivity in the educational process:

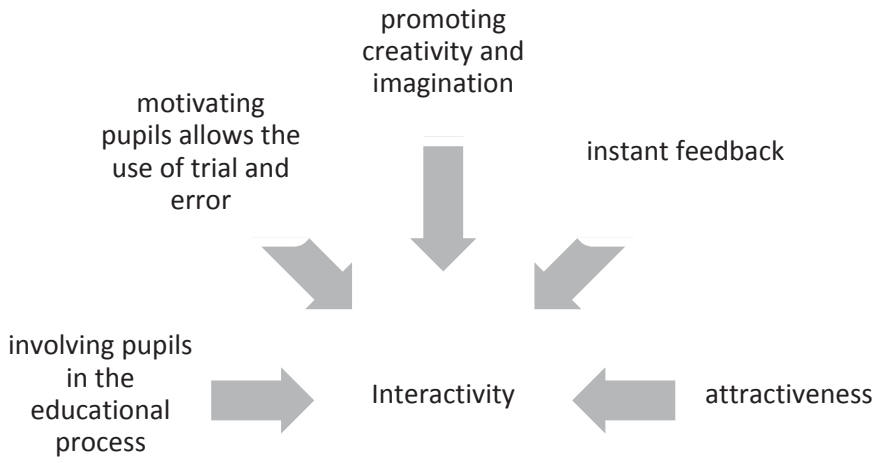

Figure 1. Interactivity in the educational process
Source: Kalaš, 2013

Creating interactive learning materials means creating an interactive presentation on software designed for the technical system with regard to the above factors. The difference between an interactive and passive presentation is great. A passive presentation is a file with text, images, animations and audio and video links on the Internet. An interactive presentation offers the same but allows students to change its course, enter the storyline and change the set conditions.

Interactive lessons bring pupils and students more enjoyment of learning, greater self-realization and, last but not least, the discovery experience. This helps to improve the ability to receive and transmit information, the ability to communicate with peers and the ability to work. It lets the pupil or student better understand the connection between phenomena and to manage tasks faster (Kalaš, 2013).

Educational platforms. A platform is usually defined in a general sense as the core technology on which other technologies or processes are built. The point is that the platform is not closed, thus creating support for another technology or application.

By the learning platform we mean an integrated set of interactive online and offline services that provide teachers, students, parents and other people involved in education, information, tools and resources to support the development and management of education. The Learning Platform concept also includes a user interface for learning (Bojko, 2017).

The features of the learning platform can be summarized as follows:

1. Educational platforms are the technologies of the next generation of learning management systems.
2. They work mostly on the principle of SaS (software and services), based on a public or private cloud. They should be tailored to the specific institution, there is also a common platform that supports multiple users, uses shared technologies, databases and web services applications.
3. Designed to support and cooperate between multiple educational and social networking applications, they work not only as a system extension, but also as a stand-alone solution.
4. They are designed for the pupil and are maintained throughout the education cycle. Pupils are not only in predefined roles with the level of access to each course but are the central actors in the design of the whole system.
5. They are of a social nature, promoting connection between pupils and adapting the content to the needs of the pupil.
6. They include built-in analytics tools based on data consolidation within courses between institutions and also outside the institution.
7. When searching for learning content, user-generated content from other pupils can be used (Surová-Čulíková, 2011).

Mobile technologies are now in an evolving period, especially tablets, which are increasingly being used in the learning process. This is proven by the promotion of introducing tablets into education

systems in countries throughout the developed world. The tablet is a portable computer with an integrated touch screen through which it is also controlled.

Main advantages:

- tablets allow learning through tools that are natural and common for pupils,
- individual learning can be easier with these devices,
- a range of innovative educational activities can be integrated into the classroom via a tablet,
- working with tablets develops digital literacy,
- tablets can increase parents' interest in school,
- tablets have the potential to bring about changes in school education.

Figure 2. Benefits of using tablets
Source: Neumajer, 2015

Negative impacts of using tablets in education:

- applications in Slovak - most teachers agreed that they most lacked applications in the Slovak language because teachers and pupils have problems with English, and also these applications do not match the Slovak educational plan,
- access to games and inappropriate content - teachers can prevent a game from starting while they are in the classroom but they cannot prevent it starting or being accessed during breaks
- handwriting deterioration - if students do not practice writing in a workbook and write little, their handwriting deteriorates,
- working with a tablet for the whole lesson - many teachers said that it is not appropriate to work only with tablets, but the teaching must include traditional methods,
- the lesson is short - teachers said it would be appropriate to introduce so-called block lessons in order to use all the possibilities offered by tablets,
- technical problems.

Figure 3. Negatives of using tablets
Source: Brečka, 2018

The tablet helps develop visual perception, memory, attention, contributes to the development of fantasy, imagination, concentration, vocabulary, and also affects the development of mental abilities such as: categorization, generalization and abstraction and the development of fine motor skills, spatial orientation, temporal imagination. As a didactic device, the tablet influences the various components of the educational process and it also promotes the development of key competences that are essential for life in the 21st century (Neumajer 2015).

Interactive whiteboard systems. In addition to the aforementioned educational platform with interactivity and information technology, interactive boards have become particularly prominent in the classroom over the past few years.

They are used for educational purposes in all developed countries of the world, and over the last ten years they have gradually established themselves in Slovak schools, from kindergartens to universities. There are definitions that describe interactive whiteboards as the material didactic means in teaching.

An interactive whiteboard is a touch-sensitive area through which the user and the computer communicate with each for maximum visibility of the content display. It combines the advantages of a classic whiteboard, touch screen and computer in one. By simply plugging in the USB cable, the board captures the movements of the interactive pen, eraser or fingers and transfers them directly to the computer.

In a broader sense, an interactive whiteboard can be understood as an electronic touch sensitive projection screen that is connected to a computer and a data projector, projecting a computer image

on its surface. Using a finger, an electronic pen, a special pointer or other tools it interacts with users and the system via the interactive whiteboard software and individual applications on the computer to maximize the clarity of the content presented, particularly through multimedia (e.g. interactive animation, movies, sounds, etc.) and other specific whiteboard tools. From a narrower perspective, an interactive whiteboard can be considered a material didactic device intended for educational purposes. It can be seen as the basis of an interactive classroom, i.e. the system consists of a computer, a data projector and a whiteboard, which is the first type of education technology suitable for class-wide interaction (Sharma 2011).

The term "IWB" in English "Interactive Whiteboard" is used to designate an interactive whiteboard in our terms and also because IT stands for information technology (Neumajer 2015)

The main benefit of IWB is to simplify and streamline teacher lesson preparation, better presentation clarity, connectivity to the network and the Internet and active distance participation. The board serves as a presentation tool but also as an input device for the entire system. Unlike the regular presentation of teaching material, the teacher can graphically enter, highlight, add important aspects of the teaching material or immediately activate other information sources on the computer or on the Internet during the presentation.

Interactive whiteboards are part of digital technology for users of illustrative interactive teaching. The device has the following advantages and disadvantages.

Benefits of an interactive whiteboard

- increases pupils' motivation to learn,
- dust-free and clean classroom,
- speed, availability of various media,
- improves digital literacy,
- keeps pupils' attention,
- active involvement of pupils in teaching,
- support pupils' independent work,
- provides instant feedback (interactivity),
- pupils can work together on a common task,
- improving the dynamics of the learning process,
- quality pedagogical principles of illustration,
- easy to save notes written during lessons,
- created materials can be reused and quickly updated,
- universal use of teaching aids,
- promotes different styles in pupil learning
- associations can be formed for different types of intelligence leading to the creation of permanent curriculum links
- promotes active learning,
- interactive software can be used to create interactive presentations
- multiple senses are involved in the cognition process (sight, hearing, touch), which increases the didactic effectiveness of education,
- where recording in the classroom is concerned, it gives the teacher room for in-depth didactic analysis of teaching,
- additional devices such as tablets, voting devices can be used.

Figure 4. Advantages of an interactive whiteboard
Source: Sharma, 2011

The most important thing is that the IWB enables all pupils to be actively involved. Using an electronic pen, they can add data, move pictures, paint, sketch and more. It can also be used during tests. In combination with a presentation in which virtually all conceivable multimedia elements (images, graphs, maps, animations, sound and videos) can be used, or with other program learning options, this technique multiplies everything.

Disadvantages of an interactive whiteboard:

- lack of pre-made teaching materials,
- time-consuming repairs of teaching materials,
- frequent use of the IWB causes loss of pupils' interest and a decline,
- unspoken mechanical activity of pupils when solving tasks,
- incompatibility of interactive software,
- financial difficulties,
- technical problems,
- lack of appropriate teacher training,
- the need for occasional calibration,
- if remote access is enabled, some pupils tend to send distracting notes or drawings to the desktop,
- they allow teachers to include more information in the classroom, which can lead to overloading pupils,
- prolonged use may cause eye fatigue and headache.

Figure 5. Disadvantages of an interactive whiteboard
Source: Miketa, 2017

Interactive whiteboards and high-quality multimedia presentations produce a creative environment that can positively affect the teaching of technical subjects. With the help of multimedia elements, it simulates, realizes and enables deeper analysis and understanding of the discussed topic for students compared to traditional teaching, by creating a real idea of, for example, the operation and principle of technical equipment or the activity of closed electrical circuits and etc.

Among the most frequent shortcomings in relation to their own preparedness, the material and technical provision of education through an interactive whiteboard, teachers state the following:

- lack of prior training,
- overall lack of digital technology orientation,
- lack of knowledge, skills with basic computer software,
- hardware component installation problems,
- lack of updating hardware and software components,
- insufficient equipment - old computers,
- lack of funding to purchase ready-made learning materials,
- inability to work with the interactive whiteboard, even if it is available for teaching,
- the fact that in-service training takes place on a different type of interactive whiteboard than that available to them for teaching.

Integrated learning environment. In the current learning environment, given the wide range of existing information and communication technologies in education, there are three levels of e-learning and LMS (Learning Management System) is one of them.

Classification:

CBT (Computer Based Training)	computer aided education. Educational programs are distributed to pupils on removable media. No internet connection required. These include various types of educational programs, games, simulations, etc.
WBT (Web Based Training)	Internet-supported education. One of the first forms of education organized online. This level allows communication between teacher and students. It is advantageous to be able to update information quickly. The training has no standardized form and there is no admin tool.
LMS (Learning Managment System)	system of controlled education. The third level of e-learning, which is based on WBT and on a managed education system.
LCMS (Learning Content Management System)	system for creating educational content. Supports the creation of educational content, has tools for managing educational content, allows you to change the user interface in relation to content etc.

Figure 6.
Types of information technology, Source: Klement, 2017

The basic difference between traditional textbooks and electronic learning material is that it contains, besides text, multimedia elements with a high degree of interactivity. The structure consists of static elements, i.e. the written text, dynamic elements, i.e. the electronic form of the teaching material and a validation - evaluation device. It works by combining text, multimedia, and interactive elements.

Static elements consist mainly of text and a visual attachment, accompanied by symbols, mathematical relationships and icons. However, the text remains the most important means of expression. Text elements are structured according to the principles of distance learning. Learning texts in the form of e-learning must other meet criteria than classical teaching texts. This is by no means possible to identify with textbooks or scripts for traditional education, the conditions for e-learning course students differ from the conditions of full-time study.

The text must be divided into separate sections: contents, introduction, symbolic overview, icons, conclusion, literature list, key, index, glossary and so on. The pictorial component is expressed verbally and in writing. Images use figures, graphs, schemes or diagrams. These graphic elements are more interesting, attract attention, stimulate, entertain and therefore, ultimately, increase the pupil's motivation. Pupils are better emotionally tuned and learn better. The symbolic component is represented by symbols, mathematical relationships, pictograms and icons (Kabátová, 2013).

Dynamic elements are a multimedia and interactive part that can complement or completely replace static elements. They are characterized by the fact that they can only be distributed in electronic form. Multimedia is used to present and transmit information using two or more generic media simultaneously (text, audio, video, animation). Being exposed to two or more senses simultaneously is important for the learning process. They are a very important part of an online course. Combining verbal and visual representations activates them, so interconnecting individual media is very important. A multimedia course can be considered as a course where the content of study is not expressed only in a static text form.

Animation and video presentations are best used to illustrate procedures and policies. They can explain some processes better to a pupil than chalk on a blackboard in the classroom. The text can be expressed not only in written form, but also in spoken form in an audio recording. This option is considered didactically more effective. Audio recordings enhance the personal character of the subject by emphasizing the pupils' important thoughts and motivation.

The validation provides feedback between teacher and student. It can include short tasks, long tasks, control questions, summaries and so on. It forms a separate component in the structure because it can be expressed by static and dynamic elements.

E-learning. Education is no longer just a part of compulsory education, preparing for a future career but is becoming a lifelong mission. An ideal society should provide equal opportunities and access to education for all those who are interested. The pressure exerted on education also changes the strategy of educational institutions so that the design of education is taking into account the new requirements and possibilities of potential students' study. For all types of educational institutions, whether public, private or commercial, nowadays, if they want to meet the needs of education, only classical forms of teaching are not enough. Therefore, distance forms of education have come to the forefront in recent years.

It brings together not only didactic but also pedagogical goals and modern media, it also participates achieving the basic mission of all education: to liberate the human individual wherever possible, especially from limitation and ignorance. The current need for the widespread use of other forms of education is the result of several current social phenomena, including those linked to providing access to education for members of the emerging information society. The crises that will survive today's education systems accentuate the mismatch of the traditional mission of the school with the new demands we face. Telecommunications, computer networks, multimedia information and communication technologies have opened new avenues of learning for all kinds of educational institutions. Students can be educated independently of time and space. It is an easily accessible form of education, democratic and tailored to the needs of each individual, an education that will be provided everywhere and for all.

In today's globalized world, e-learning is an increasingly powerful tool, including adult education. In recent years we have witnessed the electronification of almost all spheres of our society. E-learning, is and has ambitions to be a good tool also in higher education, given the decreasing number of full-time hours, as part of individualization in education, the personality traits of the current generation and the transformation of the current web. In terms of the quality of education provided, it is important to offer pupils and students innovative forms and methods of education, which undoubtedly include e-learning. There are a number of system solutions in e-learning that differ in the use of technology and are affordable (Piskura, 2017).

Emphasis is placed on independent learning, which has many different forms; different methodological approaches are used and it is as flexible as possible. Concepts such as independence, multimedia and interactivity are emphasized. It was created as a comprehensive set of educational principles and rules that enable people to study simultaneously with full economic and social activity and practically independent of the real distance from the educational institution.

The educational form is usually based on self-study, so that that the student will have complete study material. This can sometimes prevent a quite complicated search and collection of study materials. The study content is processed into a methodically produced and detailed study and electronic

teaching materials. The study is continuously monitored and coordinated by an educational institution; Depending on the study needs, it is supplemented by a compulsory or optional meeting with the tutor (Oliveira, 2014).

Definition of e-learning. E-learning is any learning using ICT. Using new multimedia technologies and the Internet, it aims to improve the quality of the cognitive process, which will facilitate access to a variety of resources and services and allow the remote exchange of information and collaborative learning. The Educational Vocabulary defines e-learning as learning in which the acquisition and use of knowledge is distributed and facilitated by electronic devices. E-learning is an innovative approach providing a quality interactive learning environment, with a focus on learning, easily accessible to anyone, anytime and anywhere using a variety of digital technologies, as well as other forms of learning materials that are suitable for an open, flexible and distributed learning environment.

Forms of e-learning. The basic condition for e-learning is the connection of the educational process with ICT. Given the wide range of technology applications, e-learning offers a range of services that are useful in teaching and learning and to some extent determine the appearance or form of e-learning. The basic division of e-learning takes into account whether or not the computer is connected to the network (Kabátová, 2013).

There are two types according to this criterion:

- **Off-line learning:** The student's PC does not have to be connected to the computer network. The study material is distributed on various data carriers. This form of e-learning is known as CBT - Computer Based Learning. In general, the term CBT is used to denote any support for the educational process. This method is currently used primarily for home preparation of pupils or students working with educational programs. Its disadvantages can be considered the impossibility of simply and rapidly updating the education's content and direct communication between participants.
- **Online education:** the condition is the involvement of the pupil's PC in the computer network. The study material is distributed through a network of channels. In addition, distributing educational content, this form of communication also enables communication between students and teachers and between students. Communication can take place in two ways, asynchronously and synchronously.
- ***Asynchronous*** - Participants are not logged in at the same time and can only communicate with each other using asynchronous means of communication. Asynchronous learning refers to real learning anywhere, anytime; the student is not dependent on anyone and studies when and where he/she wants; such as CD-Rom learning, educational audio and video media, or discussion forums. Asynchronous studying is characterized by the fact that the student spends most of his time guided by self-learning. Greater demands are placed on student autonomy. The principle of group work is suppressed and the student is not motivated to acquire new knowledge from classmates. In the same way, natural competitiveness is suppressed and so a higher motivation of the student is needed. The advantage is independence from time, place, as well as a weak Internet connection.
- ***Synchronous*** - all participants are simultaneously logged in and communicate in real time; this is on-line communication between students and tutor; everyone can be in different places, but at the same time, the condition is an internet connection; examples of synchronous communication include online courses, audio/video conferences, internet calls, virtual classes, chat. This is based on the assumption that the study is conducted using virtual classes, videoconferences or discussion forums. The question of group cooperation, which arises from the possibility of synchronous communication, comes to the fore. Students can work together, create projects and motivate each other (Barešová, 2011).

Education through videoconferencing. Video conference learning brings the specifics of the challenge whether we are participants as proponents, providers or trainees in educational lessons. However, there is also a need to invest in education and training for all players, in particular focusing on the methodological aspects of using videoconferencing and ensuring that the resulting work is carried out effectively. Videoconferences are a form of synchronous remote communication via audio and video transmission and the possibility of integrating text and other forms of information

presentation. The quality of this form of communication depends on the communication technologies used and the transmission communication network.

The participants in the videoconferencing training process are usually spatially distant from each other. Separation in space is typical of education, referred to here as distance. Videoconferencing opens up new opportunities for education in virtually every area of life today, whether it's education for doctors, biologists, managers, and the like. This brings us to the next relevant keyword, open education. Terms such as open, distance and flexible education are based on a concept other than traditional learning (Chovanec, 2018).

Basic principles of videoconferencing. Video conferencing is currently one of the most modern means of communication between people. It is based on two-way audio and video communication, allowing participants to communicate with each other, see and hear each other, even though they are often very distant geographically. This is synchronous communication that actually requires the participants to be physically present at the same time but not tied to its location.

Generally speaking, videoconferences are taking communication to a new quality level, which is very important in today's collaborative working style. Video conferences provide the opportunity to communicate via electronic channels in the most natural form, because both audio and video are transmitted at the same time. Video transmission is not the only added value that video conferencing enriches communication. In addition to the usual communication activities performed when calling a videoconference, it not only allows us to see the partner we are communicating with, but also lets us develop new ways of collaborating between the participants in the communication. It is possible to watch documents open on a computer during one video conference meeting and even allow any participant to edit them. It is also possible to share a common desktop and actively intervene, or hold discussions and share files with the necessary data (Nemec, 2018).

Benefits. The benefits are obvious. The fact that video conferencing improves communication increases productivity and reduces costs. It is not necessary to travel to see and hear students who are in distant places. Students can be shown all the necessary things such as pictures, graphs, videos, computers, files, pictures, as well as allowing them to talk to experts, letting them solve various tasks while watching them solve them. And in return, students can do the same things; they can show their video sequences, charts and photos. The role of the teacher is to develop a discussion on a given topic, as well as to foster student conversation.

Videoconferencing enhances the quality of education by creating conditions for natural communication where there is no other solution. Videoconferencing meetings are often more efficient because they are usually time-limited and carefully planned. Videoconferencing is great for distance learning. With this technology distance learning is hardly distinguishable from the traditional classroom. The teacher does not have to rely on the fact that, for example, the assignment sent by post is produced by the student him/herself, but he/she can be in control of the process. Video conferencing can address situations for schools where teachers who attend lectures from a distance are taught. It would save time and money.

Video conferences help reduce the costs of educational institutions as educational needs grow in the following ways:

- new information can spread more quickly,
- participants' needs can be met more quickly by learning in real time,
- more participants can be trained more quickly without increasing training centers,
- experts in the field can participate in education at low or zero cost,
- the timetable is more flexible - courses can be offered at any time during working days,
- participants and their teachers can stay in their usual work place, increasing employee availability and significantly reducing travel time and costs. (Langer, 2016).

Disadvantages. Obviously, videoconferencing is simply trying to replace the full-time form of education by using electronic means. There are areas where this compensation is not sufficient and therefore videoconferencing is not always an adequate form of reporting. The teacher must respect the technical limitations of this technology. He/she must avoid all sudden and rapid

movements, not come out of the camera range, also some fine details or facial expressions may be misinterpreted in the video encoding and decoding process and even if it sounds counterproductive, using image compression is recommended to reduce the visual information we send.

Another disadvantage is that the electronic connection is a delayed communication process, interactive communication (even if it takes about one second) can hinder the rapid communication of subscribers, so it is necessary to have patience when waiting for a response. Another limiting factor is the reliability of the connection. The connection can be broken maybe because of line congestion or accidental connection error. The cause is often due to poor operating videoconferencing equipment or incompatibility with the standard. Videoconferences are used within both traditional and distance learning. The goals and methods of using them in these two different applications may differ. However, the basic methodological principles remain the same in all applications. Video conferences should be used to provide the best of traditional and distance learning: combining face-to-face meetings with well-prepared study materials (Kalaš, 2013).

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