

THE IMPACT OF VIRTUAL REALITY, BASED ON COLLABORATION AND COOPERATION, ON THE LEARNING AND EDUCATION OF YOUTH*

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Abstract

The use of information and communication technology in education has shed new light on the very notion of learning, supporting the possibility of its achievement through online collaboration. In well-designed online learning environments, students experience meaningful knowledge acquisition in an e-Learning community, where collaborative group activities are encouraged.

Together with the emergence of the knowledge society and the theory known as "connectivism", knowledge is transformed into a certain dynamic relationship model, and learning is transformed into a continuous process of new connections and creation of network patterns. Knowledge increasingly becomes a social act distributed through networks. Today, global connectivity facilitates new ways of social interaction and allows collaboration in virtual environments, turning students into protagonists of common actions.

In recent decades, researchers have explored the extent to which information and communication technology could support the collaborative learning process. While some have relied on learning theories already developed without considering computer support, others have suggested that the field needs a theory adapted to the challenges faced by those trying to specifically understand how technology contributes to the achievement of collaborative learning. New developments in collaboration theory shows the fact that ICT offers new types of media, which encourage the collaborative construction of knowledge, facilitate the comparison of knowledge constructed by different groups and help groups in the act of negotiating the knowledge they build. Moreover, these technologies and models eliminate blockages in the communication process with the teacher (Albulescu, 2021).

Key words: *Virtual reality, Collaborative and cooperative learning, Virtual learning environments.*

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1. Theoretical aspects

The Covid-19 pandemic has revealed many and different negative things, but also positive, good and useful ones. Among the latter is included the need to know how to use the computer, through which direct human-to-human contact is avoided and, therefore, the illness and spread of the disease, epidemic, deaths, etc., but also the development and continuation of life and activity in society.

Along with the arrival of the pandemic, more and more teachers and students have had to adapt to a new style of teaching and learning. Whether we are talking about teacher training or equipping students with tablets and computers, the transition from traditional education to *digital education* (or *online education*) was sudden and required patience and perseverance from everyone. Here we are today at the point where online education is no longer mandatory, but the children still want to work from laptops or smartphones. Why and how this change occurred, what are *the benefits of online education* and why we consider it a step that should have been taken long ago, we will discuss in today's article (<https://upper.school/educatia-digitala-un-criteriu-din-ce-in-ce-mai-important/>, online, 30.11.2024).

Contrary to the opinions of many people who have publicly discussed this issue, the current generation was born, raised and formed in the proximity of constantly evolving technology. While adults are still learning certain functionalities of smartphones, children almost instinctively begin to use a multitude of tools without receiving much explanation. According to a study conducted in 2018, 79% of the participating students stated that they prefer *online education* as opposed to traditional education. This is happening due to the generational change that we adults have to manage (<https://upper.school/educatia-digitala-un-criteriu-din-ce-in-ce-mai-important/>).

One of the most important benefits of *digital education* for students is the quick access to any kind of information. Of course, this can help or harm, depending on how we educate children about source verification, the authenticity of information, but also the emotional factor and context. Unlike school twenty years ago, going to the library to find out information about a certain topic has been replaced by a simple Google search, which is not a bad thing.

However, as we previously said, it is necessary to educate the little ones from the moment they first step into the world of technology, regarding several important aspects related to the information from the internet: does the information come from a source we trust? Has that information been used or taken over by other reliable sources? When the information is presented to us, is it neutral in nature or does it appeal to the emotional factor to attract the reader's attention? These are just some of the aspects that both we and our children should follow rigorously when looking for an answer in the vast world of the internet.

Considering the affinity that students have for the virtual world, we can say that their desire to continue their education in the online environment is justified. The comfort that technology offers, the elimination of logistical problems such as traveling to school or transporting heavy textbooks in schoolbags constitute the greatest advantage of online school. However, at the beginning of the pandemic, Romania was not ready to completely switch to the educational digitalization; hence

a major question arises: what can be done to give our children access to this informational benefit that they need as a natural form of evolution?

One of the solutions that can be given for this problem is their enrollment in online extracurricular training courses, which will not only keep them close to technology and will not suddenly interrupt their learning pace, but will also prepare them intensively to achieve a higher performance than the school curriculum.

Ultimately, it is not the physical presence in the school space that brings learning performance, but the ambition, desire and perseverance of children that facilitate the path to academic success. (<https://upper.school/educatia-digitala-un-criteriu-din-ce-in-ce-mai-important/>, online, 30.11.2024).

The adoption of emerging technologies and access to the Internet has significantly transformed the educational field both globally and in the local context. This transformation has become even more pronounced with the implementation, either as a whole or in part, of digital educational systems. These changes have facilitated access to a variety of educational resources, improved collaboration between students and teachers, and allowed for rapid adaptation to the constantly changing requirements of the modern educational environment.

Digitalization also offers several starting points for the automatic analysis and evaluation of (later digitized) the learning processes and their improvement. Through learning analysis methods, algorithms can increasingly take over the control and manipulation of the learning processes.

The adaptation of the education and training system to technological evolution is a complex process, necessary for the preparation and improvement of human resources and an essential element of the development, modernization and innovation of society. The use of new digital technologies is the direct path to making school more attractive for the students, more adapted to their needs and lifestyle, more efficient in developing skills, generating lifelong learning.

The impact of digital transformation on society and the labour market, as well as on education and training systems, is increasingly evident. From this perspective, digital transformation in education is driven by advances in connectivity, the widespread use of digital devices and applications, the need for individual flexibility and the acute demand for digital skills.

In terms of actual screen time like phones, tablets, laptops, studies have found that students between the ages of 13 and 18 use these devices, on average, for between 5 and 6 hours per day. This number of hours refers to watching TV, surfing the internet, watching videos, or other media activities, and does not include the time children spend in front of such a device for homework and school projects.

According to sociological research, children aged 9 to 13 are exposed, on average, to up to 4 hours and 30 minutes, and those under 9 – 3-4 hours, daily. Thus, almost automatically, screen time will increase substantially with the introduction of school hours and homework/ study projects in a digital system. The advice of specialists for teachers and parents is that the time students spend in the virtual environment should be organized, taking into account several elements (Vlaicu, 2024):

- Different learning needs;

- Optimal screen exposure time depending on the age of the children;
- School and exam curriculum;
- The need for socialization;
- The level of digitalization.

An essential role in these projects is played by e-learning platforms, which are becoming increasingly important in the field of education, in the context of a world in continuous digital evolution. They have become a fundamental basis for offering students and pupils modernized, flexible, comfortable and accessible learning opportunities, as required by the educational institutions.

The teaching materials created through these platforms can be accessed from an interactive whiteboard, hybrid system, laptop, tablet, PC, TV and phone. The lessons, courses, tests or questionnaires created can be previewed before publication, exactly on the type of device on which it will be accessed by the learners and automatically adapt to the size of the screen from which it is accessed.

A significant advantage of using online learning platforms is the possibility they offer educators to customize their instructional strategies to meet the specific needs of their students. Given the cultural diversity and variety of knowledge levels of the students, teachers can adjust the method and intensity of instruction individually. Furthermore, the inherent flexibility of these platforms allows teachers and users to develop or collaborate on projects, without being limited by their geographical location.

Although used for a long time in school training (but also in education in general), collaborative learning is considered a modern, active and activating method, generating a deep understanding of knowledge, respectively, of the formation and safe/ complete development of performances and skills. At the level of common sense, there is no difference between collaboration and cooperation. However, from a pedagogical point of view (and not only), between the two concepts there can be identified aspects that are not common.

We emphasize that *collaborative learning* is a personal philosophy, not just a classroom technique. The essential premise of collaborative learning is based on consensus through cooperation with the members of the group, thus avoiding competition through which the most gifted individuals greatly outperform other group members. *Cooperative learning* is defined by a set of processes that help educational actors interact to achieve a specific objective or develop a final product. Although there are many mechanisms for group analysis and introspection, the fundamental approach is teacher-centered, while in collaborative learning the educational process is more student-centered. Therefore, cooperative learning involves the combined actions of several people (students, teachers) in achieving common goals through influences that benefit all those involved. *Collaborative learning* focuses on the relationships involved in tasks, and *cooperation* on the process of achieving the task. (Oprea, 2003). The same author emphasizes that "collaborative learning integrates cooperative learning" (Oprea, 2003).

According to Johnson & Holubec (1998), the five fundamental elements that characterize this type of learning are:

1. Positive interdependence. According to this principle, the success of the group depends on the effort put into accomplishing the task by all members. Students are directed towards a common goal, stimulated by a collective appreciation, the result being the sum of everyone's efforts.

2. Individual responsibility. According to this principle, each member of the group assumes responsibility for the task to be solved.

3. Formation and development of social capacities According to this principle, students together aim to stimulate interpersonal intelligence, namely the ability to communicate with each other, to request and receive support when needed, to offer innovative ideas to others and to resolve conflict situations in everyone's interest.

4. Face-to-face interaction. According to this principle, direct contact with work partners is sought, chairs are arranged in the group so that small interaction groups can be created or software methods are used to encourage and help each other.

5. Group task sharing. According to this principle, time is reserved for thinking about how each member and the group will solve the tasks.

Collaboration is conceptualized primarily as a process of constructing shared knowledge and meaning. Meaning formation is not the expression of mental representations of individual participants, but an interactional achievement that takes place in various sequences of utterances or messages of multiple participants. Therefore, learning is viewed from this point of view as a social act that emerges through the collaborative construction of knowledge (Catalano, 2019).

However, many have defined cooperative learning and collaborative learning in a similar way. Both are mechanisms for group learning, in which students acquire a set of skills or knowledge (Johnson & Johnson, 1989; Slavin, 2015). The five defining elements for cooperative groups identified by D.W. Johnson and R. Johnson (1989) are: positive interdependence, individual responsibility, promoting interaction, social skills, and group processing. Other theories that provide a basis for this learning model include distributed cognition, problem-based learning, group cognition, and situated learning. These theories focus on the social aspect of learning and knowledge development and recognize that learning and knowledge construction involve interpersonal activities, including conversation, argumentation, and negotiation.

The distinction between cooperative and collaborative learning was clarified by R Dillenbourg as follows: "in cooperation, partners divide their work, solve sub-tasks individually and then assemble the partial results to form the final result. In collaboration, partners actually work together" (Dillenbourg, 1999). In collaboration, all students perform the same task together and get to a result, while in cooperative learning, different tasks are divided among the group members and then all the individual results are brought together to achieve the goal. This means that in collaborative learning, in essence, each student performs the same task, while in cooperative learning there is a set of tasks that are divided among the participants (Roschelle & Teasley, 1995). The distinction can be summarized as follows: cooperative learning focuses on the effects of group interaction on individual learning, while collaborative learning is more concerned with cognitive processes supported by the group's unit of analysis, such as the creation of shared meanings.

From the perspective of collaboration theory, knowledge is constructed in social interactions, and learning is not a matter of accepting established facts, but is the dynamic, evolutionary result of complex interactions, which take place first of all within communities. It also emphasizes the fact that collaborative learning is a process of meaning-making, and meaning-making most often occurs and can be observed through the unit of group analysis. The goal of collaboration theory is to develop an understanding of how meaning is constructed, preserved, and relearned collaboratively, through group interaction. There are four fundamental themes in the collaboration theory (Albulescu, 2021): collaborative knowledge construction; group and personal perspectives, which intertwine to create group understanding; mediation through artifacts or the use of resources, which students can share; analysis of interaction based on evidence that knowledge has been developed.

In a process of collaborative learning, students can present and defend their ideas or beliefs, contributing to the configuration of conceptual frameworks, which is a significant change from the typical classroom activities. It involves small groups of students working together to solve a problem, complete a task, or create a positive interdependence, individual and group responsibility, interpersonal and group skills, face-to-face promotional interaction, and group processing (Laal & Laal, 2012). Teachers who introduce such approaches to teaching activities can be considered facilitators rather than experts who transmit knowledge to the students. Research has shown that when attention shifts from the individual to the group, individual learning is strengthened, not diminished (Marzano, 2003; Slavin, 1994).

The achievement of collaborative learning depends on complying with specific principles:

1. Positive interdependence, according to which the success of the group depends on the effort put into completing the task by all its members. Students are directed towards a common goal and stimulated by a collective appreciation, the result being the sum of everyone's efforts.

2. Individual responsibility, which refers to the fact that each member of the group assumes responsibility for the task to be solved jointly.

3. Training and developing social skills (stimulating interpersonal intelligence), which refers to the ability to communicate with others, to receive support when needed, to offer help or to be able to resolve conflict situations (Albulescu, 2021).

Studies and meta-analyses on collaborative learning and cooperative learning consistently show the virtues of these approaches, both in terms of cognitive (Hattie & Donoghue, 2016, Albulescu, 2021) and social development (Slavin, 2015). The mechanisms through which the collaborative learning activity takes place mainly refer to the fact that students have to explain and receive explanations from their peers.

The advantages of collaborative learning could be systematized as follows:

1. Learning becomes a truly active process. Students must organize their ideas very well and support their point of view with arguments in front of the others, in a convincing way.

2. Students benefit from knowing different points of view. When the student is exposed to different points of view, he manages to learn more.

3. The student must synthesize answers quickly. He learns how to think critically and quickly, while accumulating information, adjusting his ideas and adapting his own point of view, because he may find that his arguments are not the most appropriate.

4. Students learn to express themselves in front of an audience, to listen actively, to challenge ideas, and to build a framework of ideas with the others.

5. Collaborative learning can lead to greater student engagement and better holding of information. The collaborative learning process allows participants to reach higher levels of thinking, and information is retained longer than when they are acquired in a non-collaborative setting.

Collaborative approaches represent learning as a social process, which takes place through interacting and communicating with the others. The student actively constructs knowledge by formulating ideas, and these ideas are based on the reactions and responses of others (Alavi, 1994). In other words, learning is not only active, but also interactive. In particular, collaborative learning encourages students to work together to complete their academic tasks. It is fundamentally different from the traditional model of direct transfer: as the only way to transmit learning content, in which the teacher is the only source of knowledge.

During the process of collaborative learning, instruction is student-centered rather than teacher-centered, and knowledge is viewed as a social construction, facilitated by peer interaction, evaluation, and cooperation. Therefore the teacher's role shifts from transferring knowledge to students to being a facilitator in the students' construction of their own knowledge.

2. Methods of implementation

Due to the rapid changes today's society is subject to, given the technological progress, the computer is becoming an important and indispensable tool in the field of education, as it offers the possibility of accessing quality information in a short time, from any place, as long as there is an internet connection. The introduction and continuous development of information technologies in traditional education has produced "a change in the teaching mentality, an overcoming of commonplaces and a permissiveness to the new, which is not within everyone's reach" (Cucos, 2006, p.19), but has favored the emergence of new models in education based on modern teaching-learning means. Thus, teaching an interactive lesson can be achieved by using the smartboard, permanently connected to the Internet.

If we consider e-learning in a broad sense, we understand "all educational situations in which Information and Communication Technology means are significantly used" (ittransfer.space/2018/06/12/e-learning-in-educatia-preuniversitara-din-romania/, online, 01.12.2024), more precisely learning through electronic devices. The concept of virtual (electronic) education, known as "e-learning" or "e-education", represents "the interaction between the teaching-learning process and information technologies. E-learning is currently more than a concept, it is part of the current education, tending to become increasingly sought after due to the time savings it involves. E-learning signifies, in an unconsecrated definition, the chance for a person to obtain information easily,

quickly, in any field, without being conditioned by a physical support (paper books) or an intermediary (the teacher). This concept allows the learning process to be made more flexible, up to offering the widest range of electronic books, tips, images and text.” (www.didactform.snsr.ro/campanie-online/invatarea-online-avantaje-si-dezavantaje, 01.12.2024). Therefore, E-learning is a distance learning method carried out in an educational environment, in which classical learning methods are combined with methods based on the use of technology, developed in an attractive manner, adapted to the needs of teachers and students (trainees) (Mojolic, 2024, <https://edict.ro/mediul-virtual-de-invatare-e-learning/>, 01.12.2024).

The use of interactive virtual environments in teaching involves several aspects, namely:

- the development of a pedagogical model;
- the specification of the necessary hardware and software technologies;
- the development of an application design guide for the teacher;
- the development of an application usage guide;
- the development of evaluation tools.

The pedagogical model, specific to learning through virtual reality must be designed from a cognitive and affective point of view so as to convey to the user:

- the level he is at;
- the skills he must practice;
- the possibility of acquiring new skills, abilities, attitudes and competencies through training and repetition in the virtual environment.
- the possibility of learning at one's own pace. (Postolachi & Postolachi, 2016).

In the context of using virtual environments, the so-called *virtual communities* are developing, which are groups of young people (and also adults) with common practices and interests, who communicate with each other periodically, through a common application and in an organized manner using the Internet (Ridings, Gefen & Arinze, 2002, Ceobanu, 2016). These virtual communities deal with the most diverse topics and, obviously, there are many virtual learning communities among them. The most important characteristics of virtual communities are (Ridings, 2006):

- virtual communities are usually emergent, meaning they can be formed on the initiative of a few members;
- some virtual communities are formed on the initiative of organizational groups based on various corporations, with the aim of carrying out a task or work;
- virtual communities usually do not have leaders (in the traditional sense);
- they are dispersed in space and time, forming a complex network of relationships and communication;
- the members of such a virtual community can be *heterogeneous* in terms of social characteristics, but *homogeneous* in terms of attitudes and interests;
- communication within these communities is most often carried out in written form, which favors participation, but also eliminates some blockages in producing ideas;
- these communities offer the prospect of maintaining online anonymity, which gives all members an equal status;

- the structure of these communities sometimes allows abuses to come from some members;

- leaving such a virtual community is extremely easy.

Virtual learning communities can be seen as a subspecies of virtual communities. These learning communities retain the general characteristics of a virtual community, but also have some specific features (Lewis & Allan, 2005):

a) *Simple learning communities* (closed or open). Their members enjoy a number of advantages:

- increased motivation to learn;
- freedom to support their own ideas;
- opportunities to develop autonomous learning;
- opportunities to interact with colleagues in various ways;
- a meeting place with people who have the same way of thinking;
- a meeting place to debate common ideas;
- overcoming the boundaries and traditional structures within an organization, facilitating the dissemination of information and good practices.

b) *Managed learning communities* are organized by institutions or organizations. As a rule, they have people who play the role of facilitators (tutors) and a community management group:

- the management group provides technical and administrative support for
- the virtual learning community;
- the learning community is supported by certain learning objectives;
- members and facilitators jointly bring new educational ideas and approaches;
- members of the virtual community develop learning tasks through
- cooperation;
- increases the flexibility of the communication process between members.

c) *The complex learning communities* usually include people with expertise in a field and are established with the aim of providing support and guidance in some areas considered important. These communities have the merit of developing strategies and opening directions of evolution in their fields (Lewis & Allan, 2005).

It is generally accepted that the basic constitutive elements of any educational environment (including the virtual one) are: *resources, activities, support and evaluation*. In the context of virtual learning environments, the four elements take on specific forms and individualized profiles determined by the translation of the educational act into the area of computer-mediated actions (Ceobanu, 2016).

3. The experimental – applied dimension. Partial results of an educational micro-research

The international situation caused by the COVID-19 pandemic led to the decision to suspend in-person classes, and thus, the education system reoriented itself towards new types of communication and cooperation to ensure the continuity of learning.

However, the exclusive use of distance communication means to provide education has led to major pressure on the education system and society as a whole. However, there have also been certain advantages of learning online.

Learning with the help of a laptop, tablet or mobile phone brings numerous advantages, practically students having access to education (formal and non-formal school) from wherever they are, the obstacle of distance disappearing.

With the help of advanced technologies and the multitude of applications in the educational field, it is possible to better achieve student-centered learning and better adapt to new pedagogical theories. Activities that involve student collaboration as well as activities where certain curriculum topics can be approached in a trans-disciplinary manner can be designed: Source: (<https://edu.freepedia.ro/invatarea-online-avantaje-dezavantaje>, online, 01.12.2024).

Digitalization is a normal process, which is increasingly part of our real life. The challenge caused by the pandemic has generated a new perspective on learning. Thus, we find that, in fact, the pandemic has created opportunities for change and development. Therefore, learning in today's society requires a new perspective on the contents of learning, due to the opportunities made available by new information and communication technologies, digitalization being a way of adaptation and a condition for the success of the next generation. (<https://edu.freepedia.ro/invatarea-online-avantaje-dezavantaje>, online, 01.12.2024)

Following a micro-research conducted on a sample of 153 students from the Faculty of Letters (Romanian – a foreign language) and the Faculty of Physical Education and Sports (University of Craiova), we identified some of the advantages and limits/ disadvantages of online learning, from the point of view of cooperation and collaboration (active and interactive) (see Table no. 1), on a rating scale from 10 to 100 (Not at all, to a small extent, to a large extent):

Table 1. Online learning, based on collaboration and cooperation

Advantages (%)			
	Not at all	to a small extent	to a large extent
The use of e-learning platforms, which provide access to knowledge, at any time and any location;	8	23	69
the stimulation of creativity;	10	33	67
accessibility, comfort and flexibility;	10	29	61
learning at one's own pace;	9	30	61
interaction with colleagues, but also with the teacher;	11	33	66
fast feedback;	12	30	58
access to information	10	38	52
Disadvantages (%)			
	Not at all	to a small extent	to a large extent
lack of technology, such as: phone, computer, tablet and internet access;	33	34	33
connection problems;	38	34	28

students always need motivation to be present in class;	25	40	35
need for computer skills;	30	31	39
fatigue, back and eye pain;	34	34	32
lack of face to face, physical communication and interaction;	28	38	34

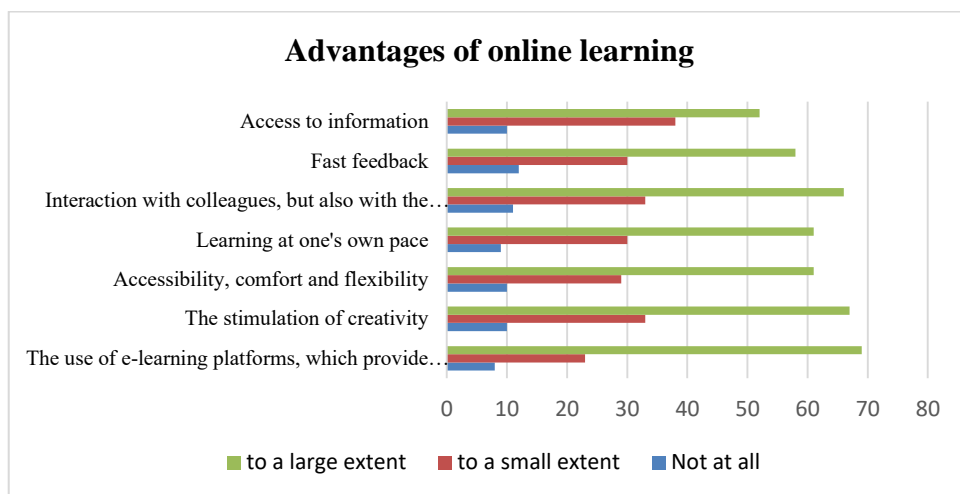


Figure 1. Advantages of online learning

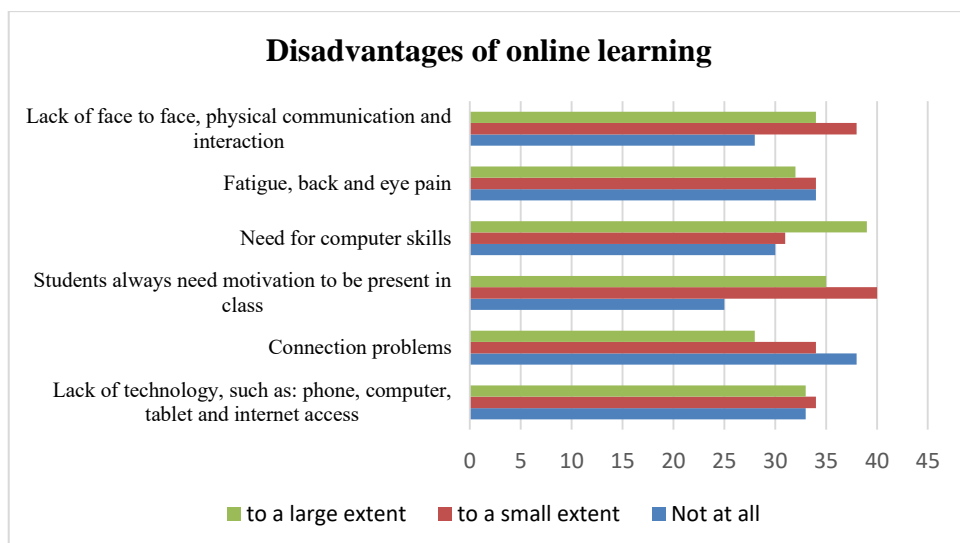


Figure 2. Disadvantages of online learning

From the data presented, we can appreciate that students, in relation to the efficiency of online learning, have identified several positive aspects, respectively, advantages, but also negative ones.

Of course, there are other advantages and disadvantages identified by the specialized literature and even by the students (native intelligent, generation Z), students, master's students, expert agents involved in making education more efficient, etc. We must be aware that the physical reality we live in is doubled, complemented by virtual education. Children are born into a virtual world, which intersects with the real one and which develops a horizon of expectation for them, in various forms. Their adaptation to reality is rapid, *starting from the virtual game* ("didactic gamification", Văidăhăzan, 2020), to *virtual learning*, parallel to the real one, respectively to *fulfilling professional obligations, in working from home*, on a laptop or computer, even on a smartphone.

4. Conclusions

Virtual Learning Environments (VLEs) are a system for delivering educational materials through the web. This system involves assessment, supervision, collaboration, and communication with the students. It can be accessed both on and off campus, meaning that the students can access information outside of the classroom. This allows institutions to provide support to both regular students and to those who cannot visit campus regularly due to geographical or time constraints. (such as distance learning students or those who are employed part-time).

The learning environment is provided through a course management system or software program that uses virtual reality technologies to facilitate learning. The system includes curriculum mapping, student tracking, online support for both students and teachers, communication through electronic means.

Benefits include: technical support; the possibility of transmitting a meaningful experience for students; the ability to deliver courses to a large number of students/ youth/ adults; the inclusion of communication mechanisms to support student dialogue with the staff and colleagues through e-mail and forum discussions; the possibility of providing shared workspaces to support collaboration among students. (https://ro.wikipedia.org/wiki/Mediu_virtual_de_%C3%AEnv%C4%83-%C8%9Bare, online, 01.12.2024)

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