

INNOVATIONS IN THE FIELD OF INFORMATION TECHNOLOGIES IN THE EDUCATIONAL SYSTEM

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Abstract: *In the context of the unprecedented development of technology and globalization, the permanent use of interactive resources and implicitly of e-Learning in educational institutions could become one of the most important achievements of our century. The use of modern information technologies brings new dimensions to the educational process. In several countries, and in Romania, strategies and programs are developed to implement ICT in the educational process, including the use of digital textbooks and computer resources as the main resources for teaching.*

Keywords: *educational process, e-Learning, educational platforms, virtual classroom, video conferencing system, educational resources, information technologies.*

JEL Codes: M48, O30, I21

Introduction

Starting from the behavior of organizations in a knowledge society, this article sheds light on the field of education, both in terms of organizing the educational process in Romanian institutions and preparing students for integration in any field of the labor market. We cannot talk about knowledge without thinking about school, just as we cannot talk about the future without thinking about children. Thus, education has become a topic of current interest in terms of the behavior of educational institutions in the context of adapting to contemporary change. We will address some of the innovations in the field of information technology in the education system, analyzing some examples of innovations, advantages and disadvantages of their use, as well as the formative contribution they have on students - future citizens in the knowledge society.

The current pandemic context requires a change in the organization of the educational process, a change to which students and teachers must adapt by using digital technologies as efficiently as possible. However, disregarding the current world situation, the use of educational software products in the education system is, moreover, a necessity for adaptation to today's society - a knowledge society. In this context, it is important for the school to teach students how to learn and promote autonomy, flexibility of thinking, ability to cooperate and communicate, anticipate change, stimulate self-learning, adaptability, maintaining a balance between individualism and socialization. Advances in information and communication technology create new opportunities for communication and interconnection of citizens and entities, leading to a major change in human behavior and the functioning of educational institutions.

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As modern technology has developed, many of the traditional methods of teaching, learning and assessment have been replaced by new interactive strategies and resources. Of course, it should not be ignored that traditional methods cannot be completely replaced and their effectiveness cannot be disputed. Thus, various debates have been generated in the field of education. Specialists wonder if pedagogy needs to be rethought or just adapted to the new period we are going through.

Today's students – digital natives

The need to change the learning paradigm comes primarily from the change demanded by students and the new skills of the 21st century. Today's young people spend much of their time in a virtual world, playing, visiting and creating, writing or reading blogs. These online activities did not take place a generation ago. Generation Z interacts with technology using one or more virtual identities, to publish information, photos, to socialize or to express their views. This intensive use of technology influences the cultural horizon, the body, the way they think or socialize, ultimately, the way they are and think.

The successful integration of ICT in teaching is part of the natural evolution of learning and is an opportunity to integrate the latest technological discoveries with the interaction and involvement offered by the traditional way of knowing. Recent studies (2009) reveal that the priority areas supported by ICT are: mathematics (87%), English (77%) and science (62%) (Harnessing Technology Review, 2008). Computers are especially useful for adapting learning activities for students with special needs or learning difficulties; facilitate teaching and have a great impact.

The human personality is the result of a long process of modeling and is presented as a synthesis of the acquisitions made by the individual (social component) and his personal possibilities (psychological component). In N. Fischer's vision, social representation is a process of perceptual and mental elaboration of reality that transforms social objects (people, contexts, situations) into values, beliefs, ideologies, allowing the understanding of aspects of ordinary life. In general, people act according to the image they have formed about reality, decipher situations and contexts with the help of a valorizing apparatus, which they perfect with each new social experience. Each possesses a "reading grid" of reality, built with the help of the meaning of acquired concepts, attitudes and opinions formed, assumed beliefs, etc., in a different way. That is why, in the construction of such a grid of the human information society, the contribution of technical means and mass communication is significant.

It goes without saying that these means did not have such an impact fifty years ago, so the young people of that time, the adults of today, had a completely different social representation. It is considered that each generation has its own values, objectives, attitudes, challenges and models, and the characteristics of a generation are defined by exposure to common experiences and influences. Even though experiences differ from one cultural space to another, contemporary sociologists and psychologists are increasingly talking about generational traits as landmarks to help us better understand young people, and last but not least to adapt communication strategies so that processes training to achieve their goals. Symbolically, Dutch professor Wim Veen attributes the labels *homo sapiens* and *homo zapiens* to the two generations. By this term, Wim Veen identifies the inner profile of young people in the contemporary period, extremely skilled in handling technology, being more accustomed to the "windows" of the computer than to those of his own home. This young man has become accustomed since childhood to operating with discontinuous information flows and has no

problem sniffing from one channel of the TV to another, carefully filtering the relevant data. He also has no difficulty communicating on the mess with several friends at the same time, talking on the phone and buttoning on the computer at the same time.

Their technology skills are highly developed, they grow with the innovations that take place in real time. It is the first time in history that children know more than adults about something important to society, such as technology. I am the generation that educates and informs itself, without the need for adult guidance. It has become a reality for students to use online and social media to do homework. These children are intelligent and independent, wanting to do things on their own and learn constantly.

HOMO SAPIENS	HOMO ZAPPIENS
Works at conventional speed	It works at high speed
Pay attention to a single task	Pay attention to multiple tasks
Use linear approaches	Use nonlinear approaches
Start learning using reading skills	Start learning using iconic skills
Learn in isolation	Learn in the community (connected with others)
It's competitive	It's collaborative
Learn by absorption	Learn by searching
Separates learning from playful activities	Learn through play
Learn by internalizing reality	Learn by externalizing fantasy

Table no.1 Differences between generations

Source: Veen, W., Vrakking, B. (2015). *Homo zappiens. Gaming and learning in the digital age.*

E-learning is a distance education system increasingly present in Romanian education. Teaching-learning-assessment activities can be planned, and the content of asynchronous lessons can be transmitted very easily via the Internet, using certain learning platforms specially designed to allow students access to online lessons as well as assessment questionnaires. A first advantage of computer-assisted learning is determined by allowing access to a large audience, regardless of location, time, age or nationality.

The use of new information technologies in education involves three major interdependent aspects in terms of their effectiveness: technology, methodology and pedagogy. The intertwining of the three cannot be obtained without a teacher - the one who manages the entire teaching activity, according to well-established aims, goals and objectives. New technologies can contribute to the renewal of teachers' pedagogical practices, but this does not happen spontaneously or automatically, requiring certain skills of teachers acquired through self-improvement. Thus, we can see a first disadvantage of using new technologies in the classroom: resistance to change of teachers.

There is therefore a need for a general awareness of benefits such as the possibility of communication in all corners of the world; establishing contacts for the exchange of ideas and information of an educational nature; ease of collaboration, development of projects and partnerships. Discussion chats, online correspondence, video conferencing, blogs, learning

platforms, numerous educational sites are just some of the means of communication offered by the Internet that allow teachers to move away from the traditional classroom teaching, to find windows to the whole world. The modernization of all these means is a continuous process, meant to bring improvements to the educational process and to make more efficient the daily activity of the teachers.

Another advantage of using new technologies is the attraction they exert on schoolchildren, an attraction that deserves to be exploited to help them learn more, faster and more efficiently. The possibility of communicating in real time with other students stimulates children to make friends or have conversations on topics of common interest, specific to age levels. These communication activities between students can really contribute to their maturation, if they are closely supervised by teachers, because it is important to know that not every kind of communication can be formative and that, at the same time, through online communication, students are prone to certain risks. . The role of the teacher remains irreplaceable in supporting the student's work to obtain an educational act.

In the use of new technologies in the classroom it is important to take into account the limitations of computer equipment and it is recommended that students be guided by the teacher in online communication activities, searching for information on the Internet, so that they really contribute to developing personal and critical thinking, but also information and learning management skills.

The multitude of innovations in the field of informatics bring an additional motivation in the instructive-educational activity, as they allow the variety of activities and supports used in the lessons. The computer equipment, in addition to the attractive, playful and appreciated aspect among the students, allows the creation of learning situations, the simulation of real life activities, the consultation and evaluation of the level of knowledge of each student. It is also appreciated the reduction of the time needed to prepare the lessons, as well as the possibility to focus on the individual needs of the students. An important aspect is that the student can learn at his own pace and can easily return to the notions that were not assimilated correctly at the right time.

Of course, the effective use of new information and communication technologies in schools is a long-term process, with a major significance in achieving the main goal of education, which aims to train autonomous and responsible citizens, able to integrate socially and professionally in a ever-changing world.

Innovations in the field of information technology: educational platforms, virtual classroom, video conferencing system, educational resources

In the following we will present some of the innovations in the field of information technology used in educational institutions. As the current pandemic situation requires the development of educational activities in the online environment or in a hybrid system, we will analyze the functions, advantages and limitations of the most used **educational platforms** in pre-university education institutions.

A mandatory first step in conducting online activities should be to create a **virtual classroom** - a physical classroom, but without “walls”, which has the same learning components as in the traditional system and the same level of interactivity. With the right tool, the virtual classroom ensures a faithful record of all the events in the class. Students and teachers meet in this class, can communicate bidirectionally, can see and access the same materials.

The virtual classroom is a learning environment, and it is still led by the teacher, an environment in which the generation of knowledge and their assimilation is possible at least as in the traditional classroom. In a virtual classroom, the assessment can be done uniformly, based on criteria announced from the beginning, with the same requirements and solving time for all students in the class. It is important for teachers to have all students in a virtual classroom in a single virtual environment, in an online space that facilitates the transmission of information, communication with the whole class or with each student, removing the feeling of loneliness that can set in. in the case of some students. In a virtual classroom there is also a virtual "catalog" that does not mean only the name and surname of the student together with the grades obtained or possible absences. The virtual catalog offers multiple records that allow the construction of complex analyzes on the online behavior of each student, his progress and, last but not least, the grades obtained by the student.

An educational platform is needed to create a virtual classroom. A first example of the most used is **Google Classroom** (fig. no. 1), a free Google application for schools, non-profit organizations, but also for anyone who has a personal Google Account. Google Classroom offers the possibility to maintain a connection between pupils / students and teachers, in real time. Documents can be uploaded on the platform, questionnaires can be made, teachers can create and collect homework, they can see who has finished their homework, as well as provide direct feedback to each student. Another strength of the platform is that Google Classroom automatically creates Drive folders for each student and for each topic. Pupils can thus keep track of the topics to be taught, with a single click, by accessing the Topics page.

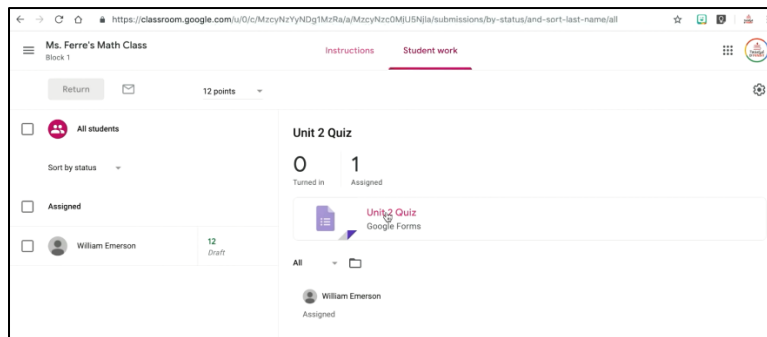


Fig. no.1 Screenshot from the application Google Classroom
Source: Google Images

Class Dojo (Fig. no. 2). This educational platform connects primary school teachers, students and their tutors through communication functions, as well as a feed for photos and videos from a school day, but also messages that can be translated into over 35 languages. At the same time, this platform allows teachers to write down feedback on students' skills and create a portfolio of them, which can be sent to parents to keep up to date with their activities. The mission of this platform is to bring together teachers, students and their parents and to offer students learning experiences that they love.

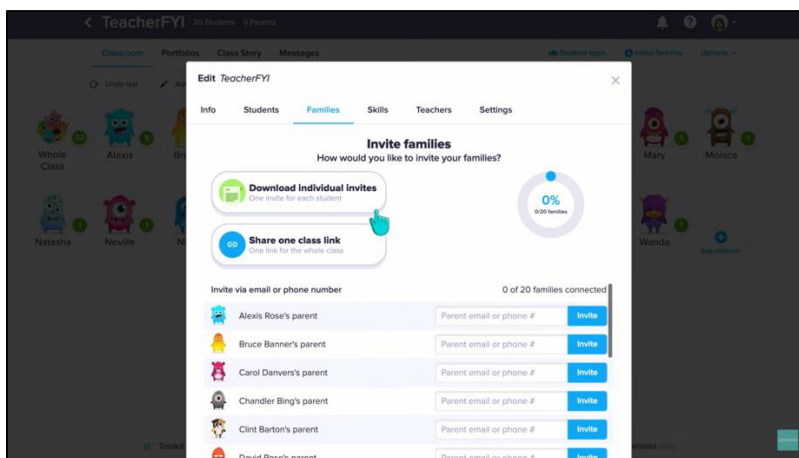


FIG. no. 2 Screenshot from the application Class Dojo
 Source: Google Images

Edmodo (Fig. no. 3) is an educational technology company that provides a platform for communication, collaboration and coaching for educational institutions, teachers and students. The Edmodo network allows teachers to share information with students, share tasks and manage communication with students and their parents, who can join the platform only if invited to do so by a teacher.

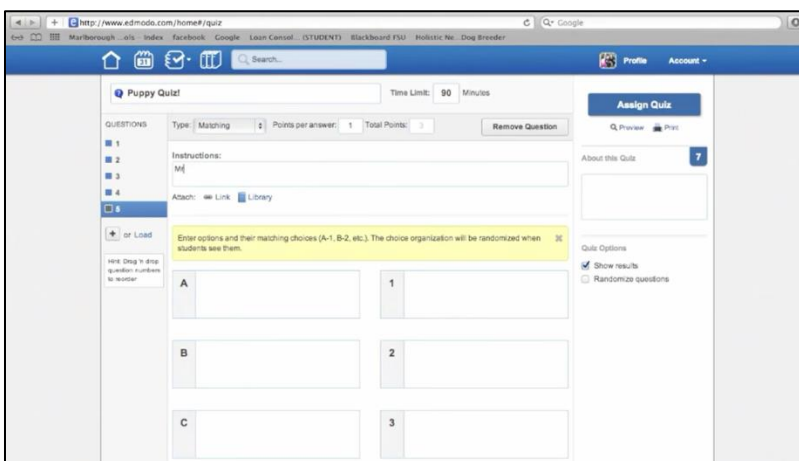


Fig. no. 3 Screenshot from the application Edmodo
 Source: Google Images

Adservio (Fig. no. 4) helps organize activities, providing access to school information, with an intuitive interface and unlimited storage space that allows quick creation of groups and classes, assignment and correction of homework, scheduling these and tests, tracking student progress and more. By centralizing everything on a single platform, bureaucracy is eliminated and thus time is gained for teaching. With a simple access, it provides teachers' activity reports, allows viewing catalogs in electronic format, generating reports to the Inspectorate and the

Ministry of National Education and provides updated information on any school activity - all accessible regardless of device used (laptop, tablet or smartphone).

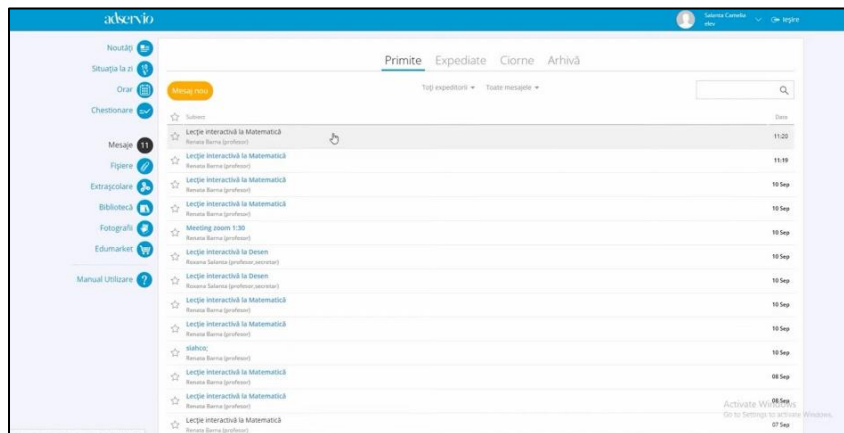


Fig. no. 4 Screenshot from the application Adservio
Source: Google Images

Microsoft Teams. Included in the free Office 365 for Education, the Microsoft Teams application is a digital hub that integrates the conversations, content, and applications a school needs. A platform that allows anyone without advanced knowledge to connect remotely. The teacher creates a virtual classroom from his account and sends the students a link, through which they can connect from any device - phone, tablet or laptop. In order to have access to online lessons, students need an internet connection and an e-mail address. The Microsoft Teams platform allows 250 people to connect at the same time, and the teacher can keep his time at home in front of a laptop. The teacher can create tests, to which he can give subsequent feedback or analyze the answers together with the children. He can share his desktop, as if it were a school blackboard. Can answer questions. Excellent integration with other resources such as One Note, One Drive or Forms makes Teams a complete educational solution, and last but not least robust and stable. It is basically a hub where the class can move completely, with teachers, students, subjects and educational resources. Ease of use is another key aspect - the control of the application is extremely simple and intuitive, at a distance of one click any desired setting or change - screen sharing, whether or not to include sound from the system, chat, contacts, documents. In addition to classes with students, meetings can be organized with colleagues in the office or meetings with parents.

Virtual classes can also work through the **video conferencing system**. Asynchronous communication and the use of an educational platform for uploading materials, homework, etc. it is not enough to keep students interested in the learning process. Next we will exemplify applications that can be easily used in the instructional-educational process.

Google Meet is a Google application that offers the possibility of organizing online meetings in real time. In Google Meet, users can track, initiate, and maintain conversations, share PowerPoint, Prezi, Word, video, desktop, and track materials with other participants. A Google Account is required to facilitate access to online meetings.

Zoom. Currently, Zoom is one of the most used platforms for online courses. Zoom differs from the rest of the platforms in that it offers a number of beauty filters that other applications in this category cannot offer. It also provides support for virtual backgrounds. The biggest advantage of the application is that it works without interruption and has a higher level of clarity than other platforms. Although the sessions can be accessed directly from the browser, it is recommended to install the Zoom application on the device, in order to prevent any technical problems.

In the process of online learning, there is a constant need for **educational resources**. The use of existing resources or the creation of new resources are conditions for the effective conduct of lessons. Many of these resources can be integrated directly into the teaching-learning process, and can be found in virtual libraries and on specialized sites. The Ministry of National Education has initiated an action regarding Open Educational Resources (RED) through which the county inspectorates have created on their own sites sections where different learning materials and resources are collected. The continuity of this approach is the construction of the Virtual School Library by integrating the collections of resources collected in each county. Here are some of the most used online educational resources:

Digital textbooks (Fig. no. 5) – are available from the preparatory class to the seventh grade and can be the defining element of the teaching process, both from the perspective of teaching and formative or summative assessment.

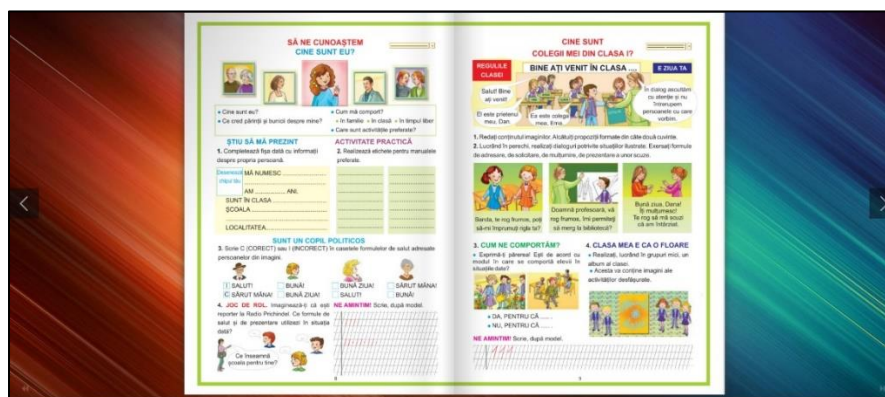


Fig. no.5 Digital textbooks
Source: www.manuale.edu.ro

ABCya - offers over 400 fun and educational games for preparatory classes up to sixth grade. The activities are designed by parents and educators.

Digitaliada - a digital education program that encourages the use of interactive work methods and digital educational content in the classroom; makes available to the general public a series of digital educational materials created by teachers and partner authors; the contents are validated by specialists.

Educational Games for Kids / Funbrain / Funology - educational games for children in preschool and primary education.

Erasmus Virtual - Erasmus + virtual experience exchanges, online courses and webinars in all areas of activity supported by teachers from all over Europe.

Lessons AeL / Microsoft Encarta / Microsoft Encarta Kids / Microsoft Oceans / National Geographic Kids / PEEP and the big world / Varox - educational software.

School Education Gatewayplatform - portal with resources dedicated to pedagogical activity and explanatory materials that can be used with students in teaching.

Intuitext School - portal with a collection of games for primary classes based on the concept of learning through play.

YouTube / YouTube Kids - video sharing platform.

Teaching online in times of crisis / Learning Corner - online platform with games, books or interactive materials dedicated to improving European knowledge for students of all ages - eLearning.

The limits in the use of innovations in the field of technology in education can be the following: the education system is only partially prepared, some teachers do not currently have enough information and skills specific to computer-assisted training; the curriculum allows to a variable / sequential / revised extent the transposition into distance activities; edtech companies have not been stimulated to build interoperable solutions, tailored to the system needs of education.

The solutions for the optimal use of new information and communication technologies are quality focus; involvement of experts; creating focused support groups; expanding the area of educational coverage of tools and support materials; creating databases with RED; a clear, long-term benchmark.

Conclusions

Educational technologies involve different methods and means, structures, characteristics and forms that correlate different operational concepts: the pedagogical project, the educational contents, the inverse connection, obtaining the students' performance, etc. The integration of educational technologies in formative education presupposes that the school focuses on the development of thinking, thereby selecting the content, methods, forms and criteria of teaching, learning and evaluation, ie to develop that educational technology that develops a certain learning style with sustainable effect. .

The integration of modern educational technologies in education becomes a condition for the formation and development of the student, if the educational process is oriented to increase his intellectual abilities, to create the optimal framework for introduction and application of educational technologies, taking into account the individual particularities and landmarks. psychopedagogical. The process of integrating educational technologies becomes accessible and innovative if it is directed towards the student, towards his education, on the one hand, and the teacher's contribution in the instructive-educational activity on the other hand. A knowledge society must be a society in which education is a priority.

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