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INNOVATIVE TECHNIQUES FOR COMMUNICATION IN DIGITAL LEARNING

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Abstract

Over the past few decades, our society has become more and more global. Electronic communication, thanks to the digitization of the majority of processes in society, eliminates distance as a barrier to interpersonal informal and formal communication. Education, regardless of the form of training in which it takes place, will continue to be digitized. It is quite natural that pedagogical communication changes in the direction of greater digitalization. This is not a replacement of the traditional pedagogical methods of communication, it is an enrichment and expansion of the possibilities for its implementation. When activities in all other spheres of economic and social life are digitized and a large part of communication is carried out electronically, education must also is being digitized. What's more, digitization should be first of all there - in education, because it provides the basis for the development of all areas of science, economy, politics.

Keywords: *learning; digital environment; pedagogical communication; educational resources*

JEL Codes: *M10; M150; M530*

1. Introduction

Determining the sustainable development of a school organization is the success rate of its students, which is indicative of their realization after completing secondary education. What realization they will find afterwards depends on the quality of the education they have received. The hypothesis that I will defend in this publication is that "The quality of education that the school offers to its students depends on the effectiveness of pedagogical communication, which in turn largely depends on the communication policy of the Vocational High Schools". This is a current topic and, in my opinion, a subject of analysis and research in order to optimize, update and improve it through digitalization of methods and means of pedagogical communication. The object of analysis will be the Vocational High Schools.

The requirements for a higher quality of education necessitates the need to update and optimize the methods and means of communication, especially between the most important communication levels for Vocational High Schools - teachers and

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students. We do not expect surprising results due to daily observations of the learning process. Each new generation has its own different and higher expectations of those it calls its teachers. The European Union's Lifelong Learning Directive is no accident. Every person has a need to develop and improve, but the Teacher is that person who should serve as an example for his students to follow. "The teacher must possess a mix of competences, including pedagogy, psychology and rhetoric, in order to successfully deal with the educational process in modern society" (Mihailova, 2019).

2. Digital means of visual communication used in Vocational High Schools (VET)

The following means of visual communication used in PG could be considered transitional between traditional and virtual pedagogical communication.

In the learning process, students communicate not only with classic pedagogical methods and means, but also through all the possibilities that digital technologies provide. They use multimedia projectors for presentations, interactive displays with built-in software, special software and applications for teaching vocational training subjects. In this paragraph, we will consider those of them that have found application for the implementation of communication between teachers and students during the training of the subjects for vocational training in PG:

- Adobe Photoshop – an application that works equally well on desktop and iPad. This makes it widely applicable and convenient to use in any situation - work in the computer room at school or at home from the personal electronic device. It is easy and convenient for both teachers and students to use online or offline and store the information in the personal cloud space. The application makes it possible to create posters, banners, websites, organize photo and text material, add colors and other effects, which makes Adobe Photoshop applicable for training in the specialties "Graphic Design", "Advertising Graphics" and "Interior Design";
- Adobe Illustrator – the other application used by teachers for training in the above first two specialties. It can be used via desktop or tablet online or offline. A characteristic feature of it is the creation of images with precise smooth lines and vector graphics, using a pen, conversion of writing styles, the possibility of editing through the tools available to the application. As an Adobe application, it works together with Photoshop when using the iPad;
- CorelDRAW – software used mainly with the Windows operating system, again mainly by graphic designers. The software serves to create, shape and edit vector images, create additional 3D and other effects where the quality is preserved with the change of scale, unlike raster (digital) ones created by Photoshop. A characteristic capability of the software is the conversion of a digital image into a vector image. For the needs of interior design, it is used in the design of wallpapers;
- AutoCAD – this is the software used the most for the needs of interior and fashion design. Through it, students, with the help of teachers, create drawings of

furniture and clothing in 2D and 3D versions, plans and unfolding of the interior, zoning and running lines, sizing models. Artificial intelligence eliminates the possibility of making mistakes in the creation of models with a high degree of complexity. It also exists as a mobile application, it is easy to use;

- 3D Studio Max – software that finds application in almost all specialties in PG for the creation of 3D models. It has an easy and user-friendly interface. The downside is that there is no mobile app.

3. Visual-virtual pedagogical communication

The development of technologies and their possibilities for application in the educational process has also created a new type of pedagogical communication - virtual. As it becomes clear, its implementation requires technical means, with the help of which the information can be stored and distributed through a digital medium. Until years ago, technologies using Web 1.0, Web 2.0 and Web 3.0 were a new possibility for working in a digital space. Web 4.0 is already on the agenda, which connects our devices in the virtual world now and at the moment. Emotionally impactful Web 5.0 - sounds challenging, but not impossible, and in the very near future. The use of artificial intelligence of Web 5.0 for the purposes of education and training will open up many new possibilities for pedagogical communication in a new and modern way, so as to provoke in the digital generation a desire to learn and improve. “Any institution that seeks to attract a new and young audience must develop and implement a digital strategy, ensure a presence on the Internet. The Internet is the second communication channel after television, from which he learns about events, visiting sites and social networks” (Borisova, 2020).

1. Virtual and augmented reality

Virtual reality (in English VR - Virtual Reality) is no longer the distant future, it is the present, it is a new way of perceiving and participating in real life, including with little explored senses. Virtual reality is unreal. It is achieved through the use of high-tech computer systems to synchronize sensory perceptions with software and hardware to achieve the feeling of presence in the studied environment. Special glasses are used to project the images. The virtual environment is controlled using a computer keyboard or specially designed devices.

For PGD, as a school related to the training of specialists with a creative orientation, the use of VR as a form of pedagogical communication will be extremely useful for all design majors. Using VR, it will be possible to create images of interior, graphic models or clothing. It will be even more useful and intriguing if we add a 3D effect to VR. Then we will get virtual and augmented reality (VAP – Virtual and augmented reality). This provoked the introduction of a new study subject "Innovative Design" in PGD, by applying and winning a project for an innovative school, where VR and VAR are set as a module for the academic year 2022/2023. In these hours, we are already working with enormous interest on the part of the students. For the

implementation of the project and the confirmation of the educational subject "Innovative design" as a good practice, special training of pedagogical specialists participating in this process is provided, as well as sharing of experience with other educational institutions.

With the help of augmented reality (AR), it will be possible to create interior and graphic projects visible in three dimensions. It will be much more interesting to work in a science class when VAR is used. Information can be stored in the cloud, and devices that allow working with VAR are increasingly affordable. Many companies are working in this direction, and this gives hope that in the near future, in Bulgarian schools, in particular - PGD, VAR will be able to be used for the education of students, and not the teacher will teach the educational content with the help of this technology, but the students will can create it.

New technologies that offer learning in an interesting and different way, provoke the imagination and creative thinking of students, are the pedagogical communication that is the closest and probably the most suitable for successful contact with today's digital generation and a step towards tomorrow's. According to A. Atanasova "…digital technologies are the basis of a number of other business activities and processes" (Atanasova, 2022).

2. Virtual Educational Resources

As with traditional learning, virtual learning also requires different educational resources. Of course, they must be tailored to the technologies that will be used. In this category, in addition to the educational platforms for creating classrooms described in the first chapter, all electronic textbooks, virtual libraries and laboratories fall:

- Electronic textbooks – created as an alternative to ordinary paper textbooks, and their initial version is their copy. They are published by most larger and established publishing houses, but still not sufficiently interesting and attractive for students. The interactive textbook looks different. When an AR marker is added to a 2D figure or drawing from a particular lesson in the e-textbook, and an AR application is installed on the technical device and recognizes these markers, the figure or drawing comes to life. Visualization through 3D allows the object to be seen from all sides, to project a movement or process, which significantly expands and enriches the students' understanding of the studied matter;
- Virtual libraries - created on the basis of an online platform. Access requires registration, which creates a profile and access code. Many of the universities and other institutions have their own virtual libraries. Creating such for vocational high schools requires financial and technological resources, which few schools can afford at this stage. Most of them, on the school website, have a section with links to electronic educational resources, many of which are offered by the Ministry of Education and Culture, as is the case with PGD;

- Virtual laboratory - as implied, access to them is via the Internet. Depending on the principle of operation, virtual laboratories are of two types:

✓ "with interactive program models" - work with program models of real objects;

✓ "with remote access to real laboratory equipment" - working with real objects from a distance. It is mainly used for working with ICT.

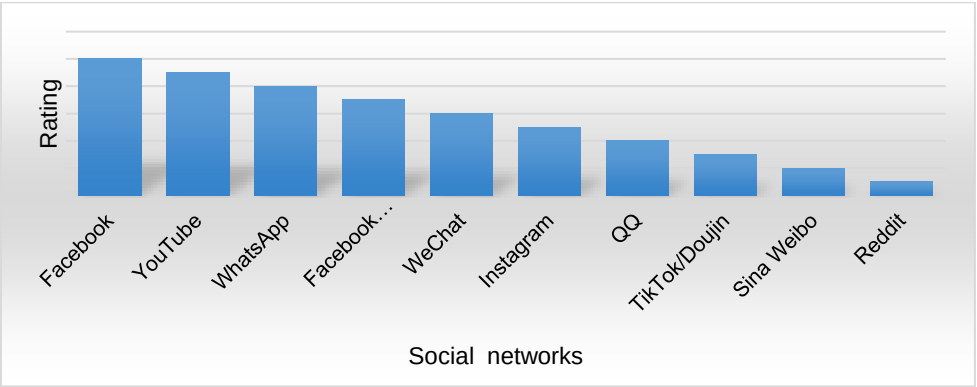
Virtual laboratories have been created in some of the secondary schools in the country under the "National Program "Building a School STEM Environment" and are used for work mainly in natural sciences and ICT, as laid down in the program. In terms of professional education and training, due to its specific nature, unfortunately, none have been built yet.

3. Social networks – formal or informal communication

To one degree or another, social networks have participated and continue to participate in the process of pedagogical communication.

The following figure presents a ranking of the most popular social networks in the world for 2019 with a rating on a scale of one to ten. With the highest rating, Facebook is seen, followed by YouTube. With the highest rating, Facebook is seen, followed by YouTube. To a large extent, it is also valid for Bulgaria, with the exception of the fact that, according to the survey carried out in the high school, Messenger and Viber are the most frequently used social networks by the teachers in the high school. According to impressions of informal communication, the new hit among students is TikTok - a Chinese video network that is gaining more and more popularity worldwide.

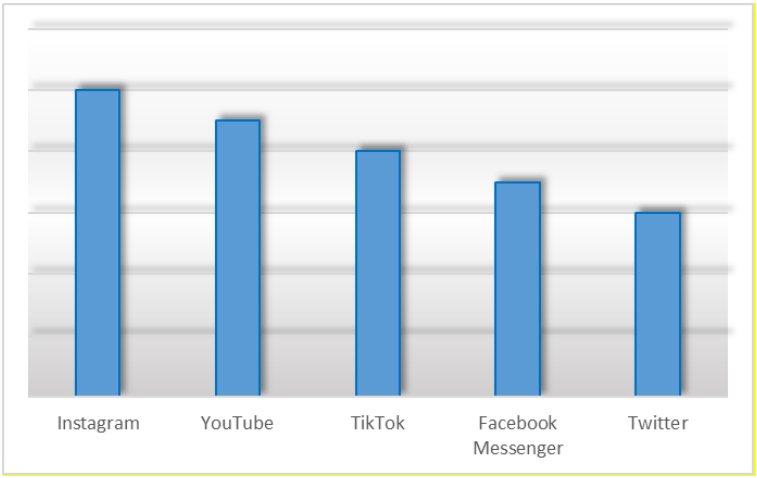
Figure 1. Ranking of the ten most popular social networks in the world for 2019



Source: compiled by the author based on data from: Top 10 most popular social networks in the world, December, 2019 , https://www.infostock.bg

To a large extent, this is confirmed by the rating of social networks in 2022, where TikTok takes third place, and the top position is given to Instagram in "Top 5: The most popular social networks in the world in 2022" (Fig. 2) .

Figure 2. Social Media Rating 2022



Source: compiled by the author based on data from: Top 5: The most popular social networks in the world for 2022, March 2022, https://businessnovinite.bg

4. Use of information and communication technologies for real and virtual communication

The wider use of interactive methods in the classroom in the teaching of OOP and PP will enable easy cross-curricular connections, through references to a specific topic related to the one being studied at the moment. In this way, the study material will be considered in its entirety, the logical sequence and dependence of everything being studied will be visible. Using modern technology, it will not be necessary to memorize information that can be very easily verified. The mind freed from excess load will have the opportunity for creative thinking and expression of the students, which will bring them satisfaction. This is very valuable for general education and even more so for the special preparation of students in professional education with a design orientation. One of the ways to achieve this is through the implementation of Project-Based Learning (PBL) using ICT. This type of training gives a much greater chance to develop the creative abilities of students from the Professional High School.

1. Project-based learning - an opportunity for creative communication between teacher and student

Classic Project-Based Learning using ICT is not something new and innovative to work in a real environment. "The core idea of project-based learning is that real-

world problems capture students' interest and provoke serious reflection as they acquire and apply new knowledge in the context of problem solving." When virtual technologies are used to work in a digital environment at a distance, then already, it is new and different. This type of training is applicable in the Vocational High School for general education and vocational training. It gives students the opportunity to learn new skills for working in a team in a real or virtual environment, a creative approach to the implementation of assigned tasks, creativity, criticality and objectivity in judgment, the ability to effectively search and find true information in the virtual space and apply it in the right place in the developed student project, presenting the project in the virtual environment. In short, project-based learning develops the communicative abilities of students and their teachers to work in real and virtual environments. When this communication is related to the implementation of a design project, according to the author, it can be called creative communication. Totseva's opinion about project-based learning, which the author also shares, is the following: "*With it, the teacher becomes a mediator, and the students work under his guidance so that: the important questions are highlighted; to structure meaningful tasks; to achieve knowledge development and form social skills and finally to be able to carefully evaluate what students have learned from the experience*" (Totseva, 2017).

Using the method of project-based learning in a digital environment, according to Glenn Whitman and Ian Kelleher (2020) in their article "Your Checklist for Virtual Project-Based Learning", requires preliminary preparation of the teacher and students, which consists of several steps:

- Checking the previous knowledge necessary for the development of the project;
- Completing the missing knowledge by gradually introducing small pieces of new information and evaluating the results;
- Consolidation and exercises to confirm knowledge;
- Stimulation of students' independence. The teacher has the role of a consultant and is always available when needed. A good approach is to implement asynchronous learning so that there is enough time for the student to find, learn, analyze and consolidate the new information;
- Checking the currently available knowledge to implement the project with a short online test with open answers to the questions.

For the successful implementation of a certain project, in addition to a clearly expressed goal, good motivation is also needed. This will help:

- The choice of a topic for the project, provoked by the students' interest and with their active participation, at the same time related to the studied material;
- Choosing the right moment and way of presentation;
- Connecting the theme of the project with global issues or the application and in the practice of the community;

- Demonstrating genuine empathy for their work on the project and willingness to support.

In the above mentioned article, Glenn Whitman and Ian Kelleher say that the successful implementation of the project also requires:

- Pre-created digital work tools with which students are able to work fully. These are the training platforms, closed social groups, forums, etc.;
- Clearly formulating the goals of the project, drawing up a plan for work on it and monitoring its implementation;
- Distribution of roles in the team, depending on the abilities of each student, according to the specific project;
- Creation of social interaction in school hours;
- Receiving feedback on the success rate of the project, incentive evaluations;

The good communication of the teacher with the students and the communication between the students themselves is a major factor that determines the direction of the project development and the results of project-based learning. The successful project will continue to work and be a means of communication with students from other classes in the school.

Learning through projects in the digital environment enriches the learning process and increases its flexibility, offering teachers a new approach to learning. It offers students an incentive to learn through different, active and full involvement in the learning process, not only the acquisition of new knowledge, but "...their change and transformation into new ones in the process of their application in project work" (Totseva, 2017).

Project-based learning is a great opportunity to apply knowledge in practice, which makes it extremely suitable for vocational high school. But the development of technologies does not stop here, on the contrary, they are constantly being improved and the most relevant at the moment are cloud technologies.

First of all, let's clarify what "computer cloud" means - it is a set of interchangeable physical machines - servers, etc., whose computing resources are united in order to provide quality and cheap "cloud" services to a wide range of users. These machines are most often scattered in space, but they can also be concentrated in powerful computing centers" (Virtual Reality, 2018). According to information from the website of the Digital National Coalition (Using cloud technologies in the learning process), there are four types of clouds:

Private cloud – owned and used only by one organization;

- Community cloud - used by several organizations with a common vision, mission and policy regarding information security and available information resources;
- Public cloud – rented or owned by an organization that acts as an intermediary offering cloud services to other users;

- Hybrid cloud – public and private cloud are connected, each keeping its own structure.

According to information from the same site, cloud services are of three main types (Digitization of education is a necessity, 2018):

- "Software as a Service (SaaS) In this model, cloud tenants pay for the use of a specific software application hosted in the cloud";
- "Platform as a Service (PaaS) In this model, cloud users rent both infrastructure and software applications hosted in the cloud to in turn offer their own services".

The advantages of cloud computing are many. It is enough to have a good Internet and a terminal device to use a resource with a large volume, which would not fit in the device's memory, without a problem. Another advantage of cloud technologies is the short delivery time of the information requested by the user. Together with the lower price for the delivery of the educational resource and the convenience of using various types of information from one place and at any time, it gives cloud technologies great opportunities for application in the educational process.

The main advantage of cloud technologies in relation to this thesis is the greatly facilitated communication between all levels of the communication structure of the High School, including parents, as directly interested in the educational results of their children.

Many institutions and companies, including mobile operators, invest in the creation of secure cloud spaces for the safe use of educational resources - platforms, educational portals, etc. “The discovery of new innovative methods and approaches to influence the human factor in governance and administration is a necessity” (Filipova & Yuleva, 2018).

By means of cloud technologies and the participation of the other ICTs that we have already talked about, at the modern stage of the development of education, it has become possible to conduct a new type of training - the hybrid one.

5. Conclusion

They will not remember all the facts that the teacher talked about in class, but they will remember the way he communicated with them, how he presented the information - with what tone and facial expression he spoke, how he dressed and in what posture stood against them, how he dealt with their problems. In the time of digitalization, the expectations for the teacher are even higher. He must be able to communicate with his students using modern methods and means, both in formal communication related to the learning process and in informal communication.

Vocational high schools must protect the name of the pedagogical specialists who work in them and meet the expectations of their students for modern and quality education. In the last three years, a lot has been done in PG in the direction of improving the material and technical base and increasing the qualifications of

teachers. Clearly, there is still much to be desired for improving pedagogical communication in a digital environment. The author's recommendations are in this direction:

- Inclusion of all teachers in new and ongoing preparatory courses for working in a digital environment in order to improve digital competences and communicative abilities in these conditions;
- Confirmation of uniform communication channels for the entire school community;
- Sending timely, targeted and structured messages to relevant stakeholders;
- Active work of management and teachers with students to create a sense of belonging to the school community, which is clearly not enough at this stage;
- Increasing digitization in the process of on-site training.

From my practice as a teacher, it is clear that there is much to be desired in terms of the administration's communication with other communicative levels. Since the administrative unit is a part of the entire school communication structure, it would be good to carry out a more extensive study in this direction as well, in order to identify the specific problems and work on their elimination.

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