Applied Digital Competences in the Innovative Didactic Methods: an overview study

Natalia Burlacu[1]

(1) Technical University of Moldova,
Faculty of Computers, Informatics and Microelectronics,
9/7 Studentilor street, Chişinău city, Rep. Moldova, MD-2020
E-mail: natalia.burlacu[at]iis.utm.com

Abstract

Although in both European Union and national policies there are many premises to bring to an acceptable level the digital skills of teachers in pre-university and university education, the current pandemic has signaled us about the lack of attention to this topic from all the factors involved (authorities - managers of educational institutions - representatives of the academic environment - teachers - pupils / students - parents, etc.) in the digitization of the educational process. It is noteworthy the case of the Republic of Moldova where still in the documents of 2017 were formulated a series of issues tangent to the deficit of digital education and, as a result, of modern quality education. These documents list such shortcomings as: (1). Graduates of educational institutions do not possess practical skills for activity in an information society; (2.) The shortage of qualified ICT staff in schools. (3.) Low level of supply of educational software to educational institutions. (4.) Low level of use of open-source software. (5). The ICT curriculum is outdated and there is no institutionalized process of regular updating. The year 2020 confirmed that the set of items to be adjusted with reference to the digitization of the didactic process, digital education, the development of digital competences of teachers and pupils/students, etc. it is below the threshold necessary for the normal functioning of educational institutions, but especially for the transposition of traditional education into the distance-learning format. In this context, present research, analyses (a.) European documents and actions of digitization; (b.) digital premises for educational purposes; (c.) the classification of educational platforms, etc. The author proposes the implementation of innovative didactic methods based on IT solutions, as solving the partial remedy of the problems previously reviewed. Additionally, the author of this approach defines the concepts of applied digital competence (ADC), and innovative didactic methods (IDM), making the difference between traditional and innovative teaching methods.

Keywords: applied digital competence (ADC), innovative didactic methods (IDM), premises of digitization

1 Introduction or premises at the level of international and national policies and actions

In the last decade, we could attest an increased interest in everything that can be included in various phrases, having digital connotations: digital skills, digital economy, digital signature, etc. Thus, in the context of the digital expansion in the socio-economic environment, regardless of whether it is about business and / or education and / or citizenship, etc., various policies, actions, and legislative acts have been promoted and continue to be approved around the world.

All these initiatives are the premises for the beneficial development of both the human factor and the relevant environments in digital matters. Among the important legislative acts that marked the evolution of digital in the EU, the same as in the signatory countries of the pre-accession agreement, we can mention the following (see Table 1):

Table 1. Documents & actions issued by the EU on digitization

Document's title & link	Essence
European Skills Agenda for sustainable competitiveness, social fairness and resilience: shorturl.at/crDF7	
The agenda (European Commission, 2020) sets ambitious and quantitative targets for improving existing skills and / or retraining and / or training new skills in order to increase the	

quality of human capital within a maximum of 5 years.

The document emphasizes the importance of lifelong learning, formulates objectives for the development of important skills in the labor market in the conditions of digital and ecological transition. The given initiative is intended to mobilize companies, social partners, and state institutions to take significant measures in this regard.

Digital Europe. Draft Orientations for the preparation of the work programme(s) 2021-2022:
shorturl.at/dhIO6

This document (European Commission, 2019) acknowledges that so far Europe has not invested enough in the latest technologies and there is a growing mismatch between supply and demand. Business, the public sector, and the academic community need to look more and more outside Europe to access the computing, data management, or cybersecurity capabilities they need, while citizens often lack the necessary skills, which would allow them to integrate and / or thrive in the new conditions of the digital economy. Additionally, the given document acknowledges that not all sectors and geographical regions in the EU have benefited equally from digital innovation.

The Digital Europe project aims to trigger investment from the EU, the Member States, and industry in key areas of artificial intelligence, advanced computing, and data manipulation, cybersecurity, etc.

The program aims to fund activities that no Member State can implement alone: collective action is needed at the European level. These will strengthen the positive impact of the digital transformation platform, Single Digital Gateway Regulation.

The European Framework for the Digital Competence of Educators (DigCompEd):
shorturl.at/inux9

As the representatives of the teaching professions are always facing demands for rapid change, educators need to be supported in the formation of an increasingly extensive and sophisticated set of skills. Today, skills related to the ability to operate digital devices are of particular importance. Thus, especially because it is the duty of teachers to help their students to become proficient in technology and digital.

This paper (European Commission, 2017) analyzes and groups these tools, including them in a common European framework for digital competence of educators (DigCompEdu). The DigCompEdu framework is aimed at trainers at all levels of education, from early to higher and adult education, including general and vocational training, special needs education and non-formal learning contexts, etc.

Compared to other Eastern countries, **the case of the Republic of Moldova** is not the most outstanding in terms of shortcomings in digital education and / or integration of ICT in the educational process, although here we also see some progress that we will describe along the way. For example, in the *National Strategy for the Development of the Information Society "Digital Moldova 2020"[1]*, approved in 2013 by Government of the Republic of Moldova, it was clearly stipulated **the need to integrate** "[…] **ICT in education**, in order to improve the educational and management process, at the system level, school and class levels […]".

And the 2017 documents - *Nomenclature of training areas and specialties of training of staff in higher education institutions* and *Qualifications Framework* - show that the demand for qualified teachers in digital education and / or with prominent digital skills cannot be met existing on the labor market (Ministry of Economy and Infrastructure of the Republic of Moldova, 2013). We are now in 2020, when the Republic of Moldova is focused on achieving new objectives that are already formulated, approved (on June 10, 2020), and published in the *National Development*

---

[1] shorturl.at/LMY57, accesed 2020.

Strategy of Moldova 2030[2], approved by Government of the Republic of Moldova in June 2020. One of the documents[3] (named *Relevant and quality education throughout life, 2020*) related to this strategy, issued by the working group responsible for education comes with findings made based on the Public Opinion Barometer which states that: (A.) "[...] the people are increasingly dissatisfied with the education that their children receive at the school, the basic formal education"; (B,) "The results in the education sector are poor in Moldova: in absolute terms, compared to neighboring countries, as well as from the perspective of equity. Human capital is a basic resource in the development of a country. In the case of the Republic of Moldova, it has lost its reputation as a qualified production factor" [ibidem]. We find that, although the Republic of Moldova has traveled a few years, it is still looking for a formula that would ensure a quality and relevant education throughout life. Thus, the working group organized to formulate a list of priorities, also called strategic measures, came up with constructive ideas, some of which we will note below (see Table 2):

Table 2. From strategic measures, the vision for Moldova 2030

Action / Measure	Argument
Developing and favoring those educational profiles and specializations that will be well articulated with the needs and requirements of the national economy, discouraging specialties that are not required by the labor market.	The aim is to attract the business environment in the elaboration of the educational offer and in the process of professional training of the staff (production practice) in order to increase the degree of correspondence of the professional training to the real needs of the national economy.
Complementing policies with talented teachers, well equipped to guide pupils and students to acquire the necessary skills in the future.	An effective system must be based on capable teachers who are willing and ready to meet the challenges of preparing students for an increasingly evolved and complex future.
Extending education beyond classroom space.	Teachers and parents need to equip pupils and students with skills and attitudes which they will implement the academic concepts outside the classroom and they will perceive learning as an organic process, not one limited to traditional teaching environments.

Based on the major issues, but also the arguments listed above, we consider that the continuous and concordant **training/education of teachers in the implementation of innovative methods based on the use of digital skills** continues to be of crucial importance. Currently in the Republic of Moldova are implementing several projects *(The Future Classroom lab, Tekwill in Every School, Educaţie online (Online Education))*, an annual series of *"uTeach"* projects launched under the logo *"Tekwill Ambassador Program"* and under the auspices of the National Association of ICT Companies (ATIC)). These projects are called to make up for the lack of necessary skills of teachers, representatives of various curricular areas. As a natural consequence of the implementation of these projects, it is also expected to expand the number of graduates of educational institutions who will have the practical skills for successful inclusion in the digital society. The situation created by the outbreak of the epidemiological crisis this year, but also in the

---

[2] shorturl.at/kpETZ, accesed 2020.
[3] shorturl.at/gkBM7, accesed 2020.

context of the actions taken by the European Commission regarding the process of digitization of society, in general, and, in particular, the need to overcome the situation faced by educational institutions, of different levels from all over the world, motivated the international organizations, the representatives of the academic and research environment, but also the teachers, in the area of interest whose ICT tools and their didactic potential are included, to support the transposition of the didactic process. Traditionally in the online environment.

2 Innovative application of digital skills: methodological and technological context

Given the specifics of distance learning with all its advantages and disadvantages, one of its biggest shortcomings is the lack or reduced presence of live interaction between teacher and student (s) and/or teacher and student (students). This fact motivates us to find either didactic or digital alternatives that would supplement and/or eliminate the effect of virtual communication between the actors of the educational activities and would somehow amplify that mutual action between the participants in the online lessons. One of the potential solutions for adding the element of live communication/collaboration between participants would be the introduction of innovative strategies based on combining the technological potential of IT tools with some interactive methods, applicable to the classroom and/or another contingent of students (larger or lower in number), even in online learning conditions.

Currently, only *collaboration platforms with the meaning of live-video communication and, partially, tools for teachers to create digital educational content* contribute to emulating a communication and, respectively, collaborations specific to the traditional teaching process. The given services have the ability to reproduce certain interactive, often personalized teaching activities that would enhance the virtual teaching dialogue between teacher-student (student) and/or student (student) / student (student) and/or student (student) - teacher. Thus, for the online lessons of major importance is the observance of **some ethical norms of virtual communication** between teacher-student (student) and/or student (student) / student (student) and/or student (student) - teacher.

Some valid rules are such as follows:

A. Choosing a virtual background decor. The action is responsible for creating the entourage of the virtual lesson, which must be a bit formal, so that those present find it easier to feel in a school and/or academic setting, etc. It refers to the aspect of the virtual space of the teacher, and also of the pupil or student. It has long been known that the ergonomics of the learning space influences the assimilation of the study material by the students; raises the level of concentration of students on those taught by the teacher, which, in total, increases the efficiency of contact teaching activities; the degree of constructive interaction between the learning actors being much higher. The setting of the virtual decor can be selected in video conferencing applications in the background settings compartment.

B. Ensuring sufficient illumination of the real and/or virtual teaching-learning-assessment space. The real circumstances of the organization and development of teaching activities also influence the virtual ones, causing some physical inconveniences and, as a psychological consequence, which affect the well-being of the actors of the educational process and, respectively, of the teaching activity, in general.

C. Observance to etiquette in online teaching activities involves paying attention to the form of addressing, the use of politeness formulas, but also the use of a polite speech and/or dialogue, without interruptions of the speaker, asking questions strictly in the question/answer session in within the lesson or in writing in the virtual lesson chat. Adherence to the given norms will diminish, even eliminate the chaos during the lesson.

D. Ensuring a decent / presentable aspect of those present and involved in the virtual lesson (of the students, of the teacher and, as the case may be, of the assistants). Here will be

taken into account the outfit, the position of the body. Do not eat, chew, drink in front of the camera.

E. The presence of the spirit of punctuality is remarkable both for the teacher and for the student. Delays are not allowed either in the conditions of the traditional lesson, especially when they become a norm. This rule also implies compliance with deadlines regarding: (1.) the supply of the study material by the teacher; (2.) the distribution of teaching resources (which are supposed to be disseminated) by the teacher; (3.) the analysis of the results of evaluations and / or practical work and (4.) the announcement of the results of the formative and / or final evaluation activities by the teacher, as well as (5.) the submission of homework by the students (pupils / students) in the terms predetermined at the lesson.

F. Control of the speaker's image during virtual educational activities is a point responsible for the active user's speech being directed to the camera and not to the monitor. Thus, all the people involved in the virtual lesson session will be able to better focus on the content of the information transmitted. Equally important is that the active user, ie the one currently speaking and / or in control of the flow of communication, takes into account the expressiveness of body language and facial expressions: to understand the reduction and control of excessive gestures and improper facial expressions.

G. As a result, **the microphone control** will reduce the effect of sound interference in the virtual lesson and, accordingly: (1.) will save the computer resources of those present at the activity; (2.) will improve the quality of the video and audio signal in the lesson for the computers of your virtual "audience" ; (3.) will eliminate noise pollution of the virtual space of your lesson which is a factor that exhausts, causes stress to the public in any circumstances: real and / or virtual.

H. The prior verification of components, such as: (1.) hardware devices (laptop, desktop computer, speakers, microphone, keyboard, tablet, mobile phone, etc.); (2.) the Internet connection and / or the application / platform for conducting the virtual lesson; 3.) digital educational resources, ie the number of materials needed to carry out didactic activities: at all types of lessons and at all stages of the lessons, as follows: (A.) presentations *.ppt / *.pptx; (B.) MS Word documents; (C.) images / diagrams and graphical representations in various formats (*.jpeg, *.gif, *.tiff, *.png, *.bmp, etc.); (D.) animations and / or video sequences to be used in the formats compatible with the platform / application / the computer on which they will run (*.avi, *.mov, *.mp4, *.wmv, *.amv, *.svi, etc.).

In the context of those mentioned above, but also from own professional experience, we consider that only the synergy of all the components listed above, assisted by the type services as collaboration platforms with the meaning of live-video communication and, partially, tools for the creation of digital educational contents by teachers, correlated with certain didactic methods and procedures in a systemic, formative and creative way, it is possible to carry out a qualitative and innovative educational intervention.

3 Applied digital competences (ADC) and innovative didactic methods (IDM): notional delimitations

Because in the present research we aimed to study the applicability of digital skills along with special teaching-learning methods to be used in both traditional and online lessons so that it is possible to carry out an effective teaching approach, able to achieve the goals from the point of view of the trainer, and also from the point of view of the trainee, we consider it necessary to define the concept of the innovative didactic method (IDM).

Training methods are associated "[...] with the research methods (of science), in the sense that both lead to outlining facts, legalities, descriptions, interpretations as close as possible to reality" and, taking into account the fact that "[...] as a rule, the teaching methods show, convey

sedimented knowledge at a given moment [...]", serving to communicate knowledge or to "[...] lead efforts towards rediscovering truths, we [...] " for those trained, but " [...] not for the scientific community " (Neacşu Ioan, 2016).

Thus, accepting this vision (Neacşu Ioan, 2016), we define the notion of the innovative method (especially in the context of online learning) as a formula with an increased effect of the organization and development of the teaching - learning process that correlates in a unique way with the other components of the training. As a rule, all together have the property to perfect both the process itself and the finalities which should be formed pursued by the educational activity in question, regardless of the format of the lesson (traditional or virtual). Based on the needs of the new teaching circumstances, those of transposition of education in online spaces, both teachers and pupils / students, and also representations of decision-makers rely heavily on the positive result of the combined implementation of innovative methods with digital skills of the actors of the educational process; the latter being applied in various didactic contexts and / or on different curricular dimensions and / or within different types of lessons.

Adapting the systemic approach to the instructive-educational process (Văideanu George, 1986) we developed the list of the particularities of didactic methods so that, in the most explicit way, to perceive the difference between the standard approach (synthesized from Neacşu Ioan, 2016) and the innovative one related to the given concept (see Table 3).

Table 3. Differentiation of the Standard Approach to Didactic Methods (SADM) vs. Innovative Approach to Didactic Methods (IADM)

SADM	IADM, the author's vision
Selected by the teacher and implemented in lessons and / or other extracurricular activities with the participation of students, and also for their benefit.	It can be selected by the teacher and / or student and is implemented in lessons and / or other extracurricular activities with the participation of students in order to increase the quality of teaching and strengthen the skills of the learner. In its version of IAMD are accepted for the educational activities of the teacher with the students both for lessons and for extracurricular activities, carried out either in traditional format (of contact lessons) or in the online format.
In all cases, the use of the method provides for the cooperation between the teacher and the students, as well as their participation in the search for solutions and / or for distinguishing the truth of error, etc.	In all cases, the method provides for the cooperation between the teacher and the students, as well as their participation in: (a.) the search for solutions and / or (b.) the elaboration of the algorithm and / or (c.) the elaboration of the algorithm implementation scenario and / or (d.) to distinguish the truth from error and / or (e.) the optimization of the solutions found, etc.
It is used in the form of selected and combined procedures, applied according to the level and / or needs and / or interests of students, in order to assimilate the knowledge thoroughly; of living values; and so on. Because the use of methods not only aims to assimilate knowledge, but also	It is used in the form of variants of developed strategies (the proceeding is only a complementary component of the method), based on selected and combined methods and procedures. Thus, the implementation of the given strategies would be carried out (as the case may be) depending on the level and / or the needs and / or interests of the students, in order to: (a.) solid assimilation of knowledge; (b.) stimulating the interest towards the intellectual activity (correlated with the study discipline, etc.); (c.) training and development of the innovative spirit; (d.) training and development of thinking (algorithmic, computational, critical, etc.); (e.) educating the spirit of self-identity; (f.) formation and development of the emotional intellect; and so on.

stimulates the creative spirit, etc.	
The method allows the teacher to manifest himself as a competent carrier of educational content and as an organizer of teaching processes during which the teacher can have different roles, such as facilitator, guide, evaluator, trainer, teaching being only one aspect of the educational process.	The method allows the teacher to manifest himself as a competent bearer of the educational contents and as an organizer of the didactic processes during which the teacher can have innovative roles, different from the traditional ones, such as: (a.) instructional design's developer (Burlacu Natalia, 2016); (b.) digital content designer; (c.) virtual mediator; (d.) e-learning tutor, (e.) software educational solutions designer; (f.) tester of IT didactic solutions, etc.

4 Conclusion

The simultaneous action of the digital competences applied with the innovative teaching-learning-assessment methods have a poly- functional character, in the sense that the actors involved can participate in concomitant or successively in the achievement of several educational purposes. Such a way of applying digital competences of the teacher, on the one hand, and of the learner, on the other hand, offers several options in terms of achieving the aims of learning, training, and development of general and specific competencies of school or academic subjects.

In addition to the fact that the context of the combined application of digital skills and innovative methods allows better assimilation of the subject of study and trans-, multi- and interdisciplinary integration of teaching contents; it increases the training of collaborative work skills and increased the level of emotional intelligence of the students in the conditions of carrying out the educational process in a framework of online didactic activities, a fact very difficult to obtain even in a traditional didactic conjuncture.

References
Books:
Burlacu, N. (2016): *Aspecte metodologice ale elaborării şi implementării software-lor educaţionale: perspective de formare a competenţelor transversale digitale.* UPS "Ion Creangă, Chişinău.
Neacşu, I. (2016): *Metode şi tehnici de învăţare eficientă. Fundamente şi practici de succes.* Polirom, Iaşi.
Văideanu, G. (1986): *Pedagogie. Ghid pentru profesori.* Universitatea „Al.I. Cuza", Iaşi.
Internet Sources:
MINISTRY OF ECONOMY AND INFRASTRUCTURE of the Republic of Moldova. (2013): *Monitoring report of the Action Plan on the implementation of the National Strategy for the development of the information society "Digital Moldova 2020" in 2017.* Available: shorturl.at/IJQUY, accesed 2020.