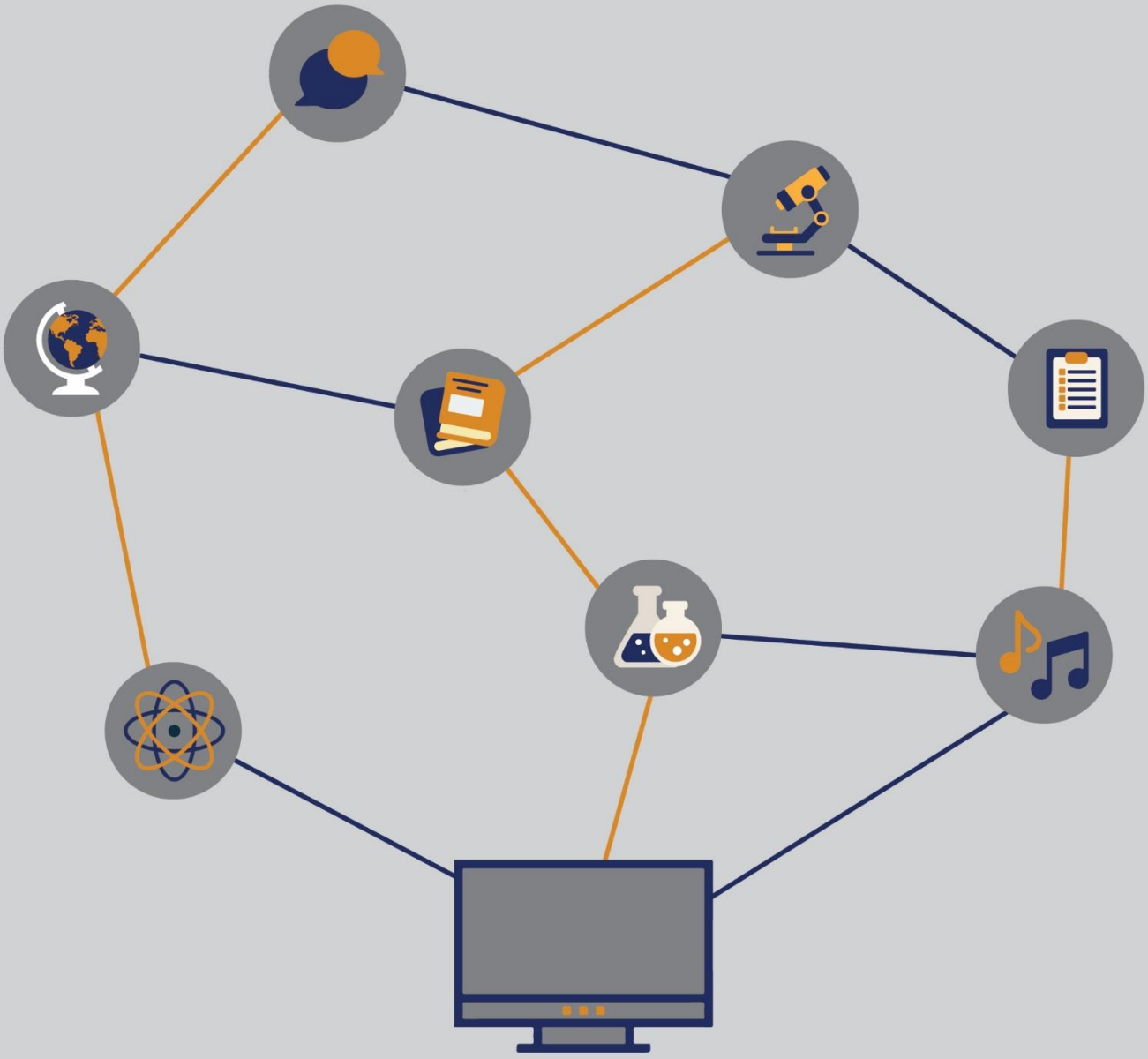
CONCEPT FOR THE DEVELOPMENT OF A DISTANCE EDUCATION SYSTEM IN THE PRIMARY AND SECONDARY SCHOOLS IN THE REPUBLIC OF NORTH MACEDONIA



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CONTENTS

INTRODUCTION

Distance education (or distance teaching and learning), although having a relatively long tradition, became extremely relevant in the first half of 2020 when almost all the countries in the world, due to the health crisis with the Covid-19 virus, suddenly switched to distance learning at all levels of education.

Distance education[1] or distance learning is an area of education that focuses on the pedagogy, the technology and the design of the teaching systems that effectively provide education to pupils/students who are not physically "in the same place" during the process of acquiring their education. Instead, teachers and students communicate asynchronously (at a time of their choice) by exchanging printed or electronic learning materials/resources or through technology that allows them to communicate in real time (synchronously). The distance education organized with the occasional physical presence of pupils/students on site for any reason, including for the purposes of taking exams, is considered a hybrid or blended system or program of education.

The use of electronic technologies and the Internet, as the primary form of communication, is the most obvious feature of modern distance education.

Distance education was initially organized in order to meet the needs of those who cannot attend regular education (employees, people living in remote areas or persons who for other reasons are prevented from attending regular education), and more recently, with the development of ICT, it was expanded in order to meet other needs in education, especially in higher education. Hence, the experiences with distance education so far are mainly in the field of higher education and in the field of adult education, and to a much smaller extent in the lower levels of education.

The distance education experiences in the first half of 2020 from different countries are still being systematized and no relevant scientific studies on its effectiveness have yet been published.

Until now, in our country there was almost no experience with distance education in the field of compulsory education. In recent years, a relatively large number of strategic documents have been adopted to raise the quality of digital skills among both the students and the teachers. A significant number of measures are envisaged in which distance learning is "hinted", but none of the documents envisages specific activities and measures for implementation of a distance learning system in the formal education system, i.e. standards for distance learning and e-learning have not been developed, nor has a national platform been established to support the entire education system for primary and secondary education.

The crisis caused by the spread of COVID-19 virus highlighted the needs and challenges to ensure the right to education in such conditions. All countries in the world have faced the necessity to ensure the continuity in the education for all students in a situation in which there is no possibility for the normal functioning of the formal education. On the other hand, this crisis, in addition to the

[1] Distance learning, also called distance education, e-learning, and online learning, form of education in which the main elements include physical separation of teachers and students during instruction and the use of various technologies to facilitate student-teacher and student-student communication (*Encyclopedia Britannica* https://www.britannica.com/topic/distance-learning).

insecurity and fear it caused, also encouraged seeking new solutions for the organization and implementation of teaching and learning. It is also an opportunity to better understand the various aspects of teaching and learning and to identify new tools and contexts for support of the learning by all children and young people.

The several months of experience with distance education, both in our country and in other countries, have highlighted the following challenges[2]:

- Lack of strategic and normative documents on which distance teaching can be based and which will provide a standardized approach in its implementation;
- Insufficient theoretical and practical pedagogical knowledge for distance teaching of all persons involved in the educational process (teachers, school support staff, school directors, advisors, inspectors);
- Insufficient digital competencies of most stakeholders in the distance education process (students, teachers, parents, school support staff, school directors, advisors, inspectors);
- Poor ICT equipment (lack or inadequate digital devices, insufficient or no internet access) of the schools, teachers and students' families.

Hence, the need to prepare a strategic document as a framework for the organization of distance education became a necessity. This document offers guidelines for establishing a distance learning system in the primary and secondary schools in our country in terms of educational policies, organization and implementation of distance teaching and it is the basis for establishing a national platform for distance learning and its application at the national level.

The concept contains guidance in the three key areas of the system where the development shall take place: educational policies, technical support/educational technology and pedagogy[3].

It should be noted that the establishment of the national platform for primary and secondary education, as the basis of the distance education system, does not imply the use of the platform only in times of crisis, natural disasters or emergencies, but the national platform and all its functionalities will also be used in the daily work of the schools, in combining the regular teaching with e-content, in offering different sources and accesses to learning, in checking students' achievements, as well as in monitoring and evaluation of the educational process by the competent educational institutions with ultimate purpose - to establish a flexible system of distance education which is easy to use, adaptable to individual needs, as well as usable for learning in school.

[2] No systematic research has been done/published yet. The conclusions are drawn based on the reactions on social media, the expression of public and expert opinion in the media, and smaller-scale research of certain conditions.
[3] according to LearnIn Pedagogy Reference Model, Regional Task Force, UNICEF, 2020

1. Introduction

1.1. Domestic strategic documents

The valid document according to which the reforms at all levels of education in our country are implemented is the *Education Strategy 2018 - 2025*[4].

In the *Strategy*, distance learning is mentioned only in the noted challenges in higher education where it is stated that there are not enough opportunities for distance learning due to the incomplete legal framework and the poor development of online learning platforms.

In terms of the use of ICT equipment and online learning platforms, the *Strategy* contains the following statement: "*Even though all primary and secondary schools are provided with personal computers available for all their pupils, the ICT use in the education process is not effective enough. Particularly, standards of the ICT use in education process are missing, and all teachers are not well trained. The available software is not meeting the current needs, and ICT is not required for implementation of many of the contents, but on the contrary, the computers are obstructing, occupying the space and hindering the communication between the teachers and the students. At the same time, pre-schools institutions and VET schools are poorly equipped with computers and other ICT means. The country is still missing a unified electronic platform for teaching and learning, as well as for providing other resources which would serve as a didactical support to teachers and students, enabling teachers' experiences to be shared and pedagogical innovations to be disseminated, thus contributing to the teachers' effective professional self-development...*"

One of the goals set in the *Strategy* is the intensification of the ICT use in education through establishing an e-learning portal and learning management system and continuous staff training to use new technologies and ICT tools in education; building a system for timely renewal of the computer equipment and creating conditions for efficient maintenance of the computer equipment and computer networks.

The ICT and digital literacy are part of the seventh pillar of the *Strategy*, the so called *General/Common Priorities in the Education System*. Hence, one of the priorities (Priority III) set out in the *Action Plan*, which is an integral part of the *Strategy*, is *Ensuring wide use of ICT in education and training and digital literacy*. Among others, the following sub-priorities are also identified: *Ensure use of ICT in the learning process* and *Establish a unified electronic platform for teaching, learning and methodological resources*. Several indicators are set for the monitoring of the achievement of these priorities, such as:

[4] http://www.mon.gov.mk/index.php/2014-07-23-14-03-24/vesti-i-nastani/2549-2018-2044

- Approved standards for the use of ICT at all levels of education;
- Necessary ICT equipment provided to at least 50% of the public educational institutions;
- Educational software for the ICT use developed according to the standards and provided to the users;
- Staff from the equipped institutions trained on the use of ICT in the education process;
- Fully operational e-platform with up-to-date teaching and learning resources available to the staff at all educational levels.

The Strategy also defines deadlines for implementation of the activities[5], but, given the current situation with the health crisis and the need for fast introduction of a distance education system, the process of developing a national platform, as well as equipping the schools may take place with accelerated pace and in accordance with a new action plan.

The goals, priorities and activities defined in the *Education Strategy 2018 - 2025* can be considered as a starting point and framework for planning the implementation of not only the specific activities but also their broadening and incorporation into a new distance learning concept for all levels of education.

Also, the new concept takes into account the experiences and certain solutions and directions, as well as the implemented activities included in other strategic documents prepared by various institutions in the country, such as:

- *National Strategy for Cyber Security and Action Plan 2018 – 2022 (Ministry of Information Society and Administration, July 2018)*[6].
- *National Short-Term ICT Strategy 2016 - 2017 (Ministry of Information Society and Administration, August 2015)*[7].
- *National e-Inclusion Strategy 2011 - 2014 (Ministry of Information Society and Administration, May 2011)*[8].
- *National Strategy for e-Content Development 2010 – 2015 (Ministry of Information Society and Administration, July 2010)*[9].

The development of national standards for student achievement at the end of primary education is underway and will be followed by the development of standards for student achievement at the end of secondary education in which the area of *Digital Competences* is harmonized with the relevant documents of the European Commission.

Based on the National Standards, new curricula will also be developed in accordance with the Teaching Plan for Primary Education and the teaching plans for Secondary Education. The standards

[5] The implementation of the activities is foreseen in the period 2020 - 2025. More specifically, the development of a unified electronic platform for teaching, learning and methodological resources, its piloting and commissioning is planned for 2022, when the development of e-content is planned, while the procurement of ICT equipment and educational software for using ICT in accordance with the standards is planned for 2025

[6] http://www.mioa.gov.mk/sites/default/files/pbl_files/documents/strategies/ns_sajber_bezbednost_2018-2022.pdf

[7] http://www.mioa.gov.mk/sites/default/files/pbl_files/documents/strategies/Kratkorocna%20IKT%20Strategija_avgust2015.pdf

[8] http://www.mioa.gov.mk/sites/default/files/pbl_files/documents/strategies/Strategija_za_e-vklucuvanje.pdf

[9] http://www.mioa.gov.mk/sites/default/files/pbl_files/documents/strategies/strategija_e-sodrzini_2.pdf

set for the area of *Digital Competences* will serve not only for the development of the curricula that is directly related to the field of informatics, but they will be also incorporated in the curricula of all other teaching subjects that require the development of knowledge, skills and attitudes in this area and use of information technology and equipment in achieving better results by the students. Certain digital competencies have been incorporated in the documents *Basic Professional Competencies for Teachers* and *Competencies for Principals*, but from the aspect of distance education they are not enough and should be supplemented with new competencies.

1.2. International documents and experiences

So far, the recommendations of the relevant international organizations have not pertained to mass distance education in the near future, but have promoted the digitization in education as a necessary next step in the evolution of the modern education. In this regard, the European Union has developed several key strategic documents:

- ***European Digital Competence Framework for Citizens***[10], a document which was developed in 2016 and updated in 2018, includes five (5) key areas with specific indicators:
- Information and data literacy: browsing, searching and filtering data, information and digital content; evaluating data, information and digital content; managing data, information and digital content.
- Communication and collaboration: interacting through digital technologies; sharing through digital technologies; engaging in citizenship through digital technologies; netiquette while using internet; managing digital identity.
- Digital content creation: developing digital content; integrating and re-elaborating digital content; copyright and licenses; programming.
- Safety: protecting devices; protecting personal data and privacy; protecting health and well-being; protecting the environment.
- Problem solving: solving technical problems; identifying needs and technological responses; creatively using digital technologies; identifying digital competence gaps.

The Framework also defines eight proficiency levels in terms of digital competencies: foundation (1 and 2), intermediate (3 and 4), advanced (5 and 6) and highly specialized (7 and 8) and offers simple ways to assess the development of competencies.

- ***European Framework for the Digital Competence of Educators (DigCompEdu)***[11], which pertains to educators at all levels of education, including also non-formal education, adult education and education for people with disabilities. The framework consists of six (6) areas with specific competencies.
- Professional engagement: organizational communication; professional collaboration; reflective practice; Digital Continuous Professional Development (CPD).
- Digital resources: selecting; digital resources; creating and modifying; managing, protecting and sharing.

[10] European Commission. *Digital Competence Framework for Citizens* (DigComp 2.0). 2018. https://op.europa.eu/en/publication-detail/-/publication/bc52328b-294e-11e6-b616-01aa75ed71a1/language-en
[11] European Commission. *Digital Competence Framework for Educators*. 2017. https://ec.europa.eu/jrc/en/digcompedu

- Teaching and learning: teaching; guidance; collaborative learning; self-regulated learning.
- Assessment: assessment strategies; analyzing evidence; feedback and planning.
- Empowering learners: accessibility and inclusion; differentiation and personalization; actively engaging learners.
- Facilitating learners' digital competence: information and media literacy; communication; content creation; responsible use; problem solving.

The framework includes six (6) levels of assessment of proficiency (newcomer, explorer, integrator, expert, leader and pioneer).

Additionally, the European Commission has developed a ***Framework for Digitally Competent Educational Organisations (DigiCompOrg)***[12], which has seven (7) key elements and fifteen (15) sub-elements that are common to all education sectors. Through the SELFIE tool, the European Commission helps schools develop their digital strategies in order to improve learning and teaching.

According to the *Eurydice (2019)*[13] report, the majority of European education systems have included digital competencies as a cross-curricular topic and have included learning outcomes. Although all education systems have some kind of a strategy for monitoring and assessing the achievement of digital competencies, it is usually part of a more comprehensive strategy in the Eastern European countries, while in others (mostly from Western, Central and Northern Europe) it is a separate strategy.

In the Republic of North Macedonia, the digital competencies, according to the program documents, are acquired through a special subject (compulsory and elective) and as a cross-curricular goal in all levels of education.

In terms of school support, most countries envisage investments in digital infrastructure, and only one third envisage measures for training of the school management to promote digital education. About half of the countries have policies to support and engage the so-called digital coordinators performing technical and pedagogical function. The situation is similar in our country. During a certain period in the past all schools were equipped with a large number of computers (in the framework of the program: Computer for Every Child), but today most of the computers are either obsolete or not in use. All teachers received training in basic ICT skills, and the principals also have a training module for using ICT as part of their training.

In most of the educational systems, and also in our country, teachers are expected to be digitally literate, and the digital competencies that are specific to teachers are recognized as part of the basic competencies of teachers. Although the definitions and scope of skills are different, they all suggest that the teachers need to know how to integrate digital technologies into teaching and learning and to be able to use them effectively. The authorities are responsible for ensuring continuous professional development in relation to digital education through various initiatives that focus on

[12] https://ec.europa.eu/jrc/en/digcomporg/framework
[13] European Union. *Digital Education at School in Europe*: Eurydice Report, 2019.

different aspects of the digitization of society. Teacher networks dedicated to digitization in education have been established in five of the countries.

Some time ago in our country, the application of ICT in teaching was one of the priorities in education and some of the teachers attended appropriate trainings, however such trainings are not offered as part of professional development.

In general, the assessment of digital competencies in teaching is a process where teachers have autonomy and is insignificantly regulated by the education authorities at the higher levels.

In our country, the knowledge and skills acquired within the subjects: *Computing and Programming Fundamentals, Informatics* (in primary and secondary education) are assessed, but not the generally acquired and demonstrated ICT competencies.

The OECD Educational and Innovation Research entitled "Teachers as Designers of Learning Environments"[14] offers guidance that can help in the development of the educational policies and the improvement of the educational process. The research emphasizes that pedagogy is at the core of the teaching and learning process realization, as well as for defining educational policies. Namely, the educational policies recommend and support the pedagogical approaches in order to achieve the educational goals and planned results. The goal is for the students to have higher educational achievements, attitudes and competencies needed for a life in a modern democratic society and to be able to become lifelong learners.

The research focuses on the pedagogical innovations in education, which provide guidance and are important in the process of introducing a change in the way of learning and teaching. The pedagogical innovations require fundamental changes in the teachers' practices and their role in the realization of teaching. In the realization of the educational process, teachers use and combine a series of methods, approaches, practices and techniques in order to achieve complex goals. The research suggests that this requires deep expertise and understanding, not just a routine of implementing the techniques.

In the process of learning and teaching, depending on the teaching subject, certain pedagogical approaches are more appropriate for achieving certain competencies. Also, when choosing the educational pedagogy, the social and cultural background of the students is taken into account in order to address the differences in the classroom.

The introduction of innovative approaches affects the teachers and the way they teach. The research emphasizes that neither the use of ICT nor the applied technology alone improves learning. Innovation in pedagogy means changing the practices and roles of teachers. Learning communities or networks need to be established in order to support the transformation through the development of pedagogical approaches, materials, knowledge sharing and leadership.

The European Commission report entitled **"Digital Education Policies in Europe and Beyond"**[15] provides examples of digital education reform policies in a number of European countries and

[14] https://read.oecd-ilibrary.org/education/teachers-as-designers-of-learning-environments_9789264085374-en#page24
[15] Conrads, J., Rasmussen, M., Winters, N., Geniet, A., & Langer, L. *Digital Education Policies in Europe and Beyond: Key design principles for more effective policies* (No. JRC109311). Joint Research Centre (Seville site), 2017.

establishment of distance learning platforms, which can provide ideas and guidance in establishing our national system for distance learning and determining the performances of the national platform for primary and secondary education.

The report points to the following important principles in the implementation of digital education policies: 1. following a holistic approach in establishing systemic change; 2. establishing a long-term vision and short-term achievable goals; 3. using technology as a means, not as an end; 4. experimentation, risk taking and failure; 5. perceiving the importance and limits of impact assessment; 6. involvement of all stakeholders in a structured dialogue; 7. motivating schools and teachers; 8. developing teaching competence.

Prior to the COVID-19 virus crisis, the focus was mainly on the use and reasonable integration of digital technologies in various aspects of the educational process, with an emphasis on improving the digital infrastructure and capacity building for teachers to use it, such as: use of a virtual learning environment, digital platforms and tools. During the COVID-19 virus crisis, all countries were put in a position to switch from classroom teaching to distance learning, and in addition to the issues of infrastructure and teacher competencies, they also put into focus the issue of the appropriateness of the used pedagogical approaches for distance teaching and the social and emotional aspects of distance education. Experiences and reflections on the "new pedagogy" have been intensively shared, but there is still not enough relevant knowledge based on research and facts.

2. Legal regulations

The primary and secondary education in our country is systematically regulated by three laws: Law on Primary Education, Law on Secondary Education and Law on Teachers and School Support Staff in Primary and Secondary Education.

Given that in the mentioned laws there is no provision for distance learning, at the time of the declaration of COVID-19 pandemic and the measures adopted by the Government of the Republic of North Macedonia that schools will not provide classes, a legal vacuum appeared as to how to regulate distance learning, i.e. home learning for the students from the 2019/2020 academic year. This situation was partially overcome by the adoption of decrees with the force of law during the state of emergency.

The need for a systematic distance learning solution, not only in conditions of post-pandemic or possible new pandemic, but distance learning as a new, additional, alternative or parallel system of education, requires consideration of different options for its organization and functioning. The offered solutions need to be incorporated in the Law on Primary Education, the Law on Secondary Education and the Law on Teachers and School Support Staff in Primary and Secondary Education.

The amendments should provide a legal framework for the introduction and implementation of quality teaching and distance learning.

The amendments to the Law on Teachers and School Support Staff in Primary and Secondary Education ("Official Gazette of the Republic of North Macedonia" no. 161/19) should be aimed at further

regulating the work duties of the teacher in terms of distance learning, determining the manner in which the teacher will use information technology in different teaching conditions, the time for planning and realization of his/her work during the working week.

It is important, in the Law, and especially in the bylaws arising from it, to provide basic professional competencies of the teacher in relation to the use of advanced information technology for planning and implementation of teaching in case of distance learning.

Furthermore, it is necessary to supplement all the articles of the Law and the bylaws which refer to the professional and career development of teachers, with provisions starting from determining the number of classes for priority trainings for work with IT technology and its use in the distanse teaching and learning, up to the necessary competencies for teacher career advancement.

In the Law on Primary Education ("Official Gazette of the Republic of North Macedonia" No. 161/19), as well as in the Law on Secondary Education ("Official Gazette of the Republic of Macedonia" No. 44/1995, No. 24/1996, No. 34/1996, No. 35/1997, No. 82/1999, No. 29/2002, No. 40/2003, No. 42/2003, No. 67/2004, No. 55/2005, No. 113/2005, No. 35/2006, No. 30/2007, No. 49/2007, No. 81/2008, No. 92/2008, No. 33/2010, No. 116/2010, No. 156/2010, No. 18/2011, No. 42/2011, No. 51/2011, No. 6/2012, No. 100/2012, No. 24/2013, No. 41/2014, No. 116/2014, No. 135/2014, No. 10/2015, No. 98/2015, No. 145/2015, No. 30/2016, No. 127/2016, No. 67/2017 and No. 64/18) amendments are required in the parts pertaining to the goals of education, the way of organization and realization of teaching, and monitoring and assessment of students' achievements.

The mentioned laws shall determine the obligations and deadlines for filling in and connecting the new national platform with ESARU and e-class register, the standards for distance learning and particularly, to determine when and under what conditions distance learning will be used.

In order to enable continuous use of the system, preferably, the laws shall prescribe a defined number of days when the distance teaching will be realized in school, i.e. to determine a number of hours or topics from the curricula that will have to be realized by use of the national platform. Also, all students who for various reasons are absent from classes, for a certain period of time, to be able to access the system and thus attend classes or receive assignments from their teachers.

It is especially important to determine the manner of organization of teaching (schedule, number of classes), the manner of realization of teaching (duration of classes, activities) and the manner of assessment of student achievements.

Given that the introduced distance learning through a certain platform is a systematic solution, it is necessary that all activities implemented in the school, which are part of the so-called extended school program or are part of the school's annual program are also legally regulated by amendments for distance learning.

Thus, the manners of distance implementation of extracurricular activities, additional and supplementary classes, and student competitions shall be defined.

On the other hand, through the national standards for students achievements at all levels of primary and secondary education, as well as through the curricula for the compulsory and elective teching subjects in primary and secondary education, the strengthening of the competencies of students to use ICT and distance learning shall be stipulated.

The amendments to the laws should emphasize the safety of the students and their personal data during distance learning.

In terms of the management and decision-making of schools, there is a need for amendments which will enable the meetings of the teachers' councils, subject teachers' bodies, school-management boards and other school bodies to be held remotely, whereby the decisions made shall be considered valid.

It is also necessary to amend the Law on the Training and Exams for Directors of Primary School, High School, Dormitory and Open Civic University for Lifelong Learning ("Official Gazette of the Republic of Macedonia" No. 10/15, No. 145/15, No. 192/2015, No. 30/16, No. 120/18 and No. 140/18) in terms of the module *Theory of Organization* where new contents need to be added referring the organization of the school in case the teaching is realized through distance learning, i.e. home learning.

PART II: EDUCATIONAL TECHNOLOGY

1. Background

1.1. Existing infrastructure for development of distance learning system

The computer equipment in the primary and secondary schools at the national level was procured in 2009-2010. It is mostly used for teaching the subjects in the field of informatics; however, its features are not sufficient to meet the requirements for the introduction of distance education.

All facilities have internet access of at least 4/0.5 megabits per second (Mbps) download/upload, at least one static IP address through which the router can be accessed, and provided secure and trusted internet environment where the clients are protected from viruses and other hacking attacks from the Internet. All facilities (all primary and secondary schools) have access to broadband internet provided by the Ministry of Education and Science (MoES), except for the primary schools in the rural areas (out of a total of 119 facilities it has provided to 63).

The high schools of the City of Skopje, i.e. 23 high schools are also directly connected to the IT infrastructure of the MoES located at FINKI, i.e. in addition to the standard internet connection they have an additional high capacity connection (1 gigabit) for the needs of the classrooms with smart boards and teleconferencing equipment. Four (4) of these schools have equipped two classrooms, one of which is equipped with video equipment for video lectures, and the other with audio equipment for attending video lectures. In the other schools there is only one classroom equipped for attending video lectures.

The equipment for the systems used by the MoES is as follows: IDC cloud data center with 20 servers, video conferencing servers and data storage devices (located in the premises of FINKI).

1.2. Functional information systems in the education in the RNM

- **ESARU.** The electronic system for administrative work of the schools is an information education's management system and a tool for collecting, processing, checking and presenting data that is important for the educational process in the primary and secondary education in the Republic of North Macedonia. The system collects, processes and presents the data on the students in the public primary and secondary schools in the Republic of North Macedonia.
- **The electronic class register** (e-class register) aims to improve the communication between teachers and parents, to inform the parents about their children's achievements, to provide quick and easy access to the information from the class register by the teachers in the school, and to provide centralized and rapid statistical analyzes by the MoES and other state institutions. The database of this system stores data about the students, the classes in which they study and the schools.

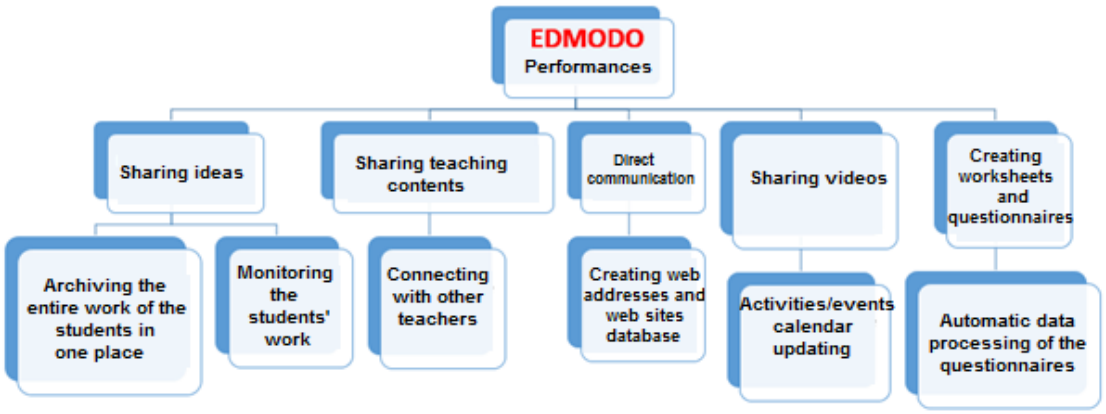
1.3. Previous distance learning experiences in primary and secondary education in the RNM

The experiences with distance education in the compulsory education (primary and secondary education) in our country, until March 2020, were limited to separate attempts and enthusiasm of certain teachers and schools to use platforms for teaching and learning. The health crisis with COVID-19 imposed the need for all schools to switch to distance teaching in a very short period of time, which was realized in the period March-June 2020[16]. In addition to the primary and secondary schools, in the past period, the higher education institutions have also intensively used the advantages of the distance learning systems for teaching, and there are many examples where the exams were also taken through communication tools.

From the experiences so far, we can mention the use of the following learning portals/platforms:

- **Eduino** is an educational portal owned by the Bureau for Development of Education, which offers digital content in support of the educational process in the country. The main parts of the portal are: 1) system for "e-teaching", developed for the creation and dissemination of teaching contents in the form of video lectures and 2) system for "early learning and development", developed for game-based learning aimed at encouraging the socio-emotional development in children. The "e-teaching" part consists of three functionalities: e-classroom/e-playroom, e-schedule and e-tests.
- **E-classroom/e-playroom** is a system for creating and disseminating teaching contents in the form of video lectures and includes: a) setting the technical criteria for making video lectures and infrastructure for their storage, b) appropriate technical training and support for teachers, c) system of control and verification of the received materials.
- **E-schedule** is a system that enables the creation of digital schedule of classes, sharing the schedules with the students and realization of the classes through the integrated teleconferencing tool.
- **E-tests** is a system for checking the knowledge and providing feedback to students. The curricula's topics related questions in the database can be used by combining, but also by supplementing.
- **EDMODO** is a free educational platform created in order to enable the connection and collaboration of students, teachers and parents. It enables creating groups, sharing teaching contents and documents, monitoring the work of the students or certain groups, communicating with other teachers, parents and students, archiving the entire work of the students in one place, creating worksheets and questionnaires and other materials. Parents are enabled to have access and monitor the work of their children.

[16] See below in the text: analysis of the use of distance learning in times of health crisis.



- **EPISTUM** is a learning management platform (Learning Management System - LMS) which is used by the Ministry of Information Society and Administration for the purposes of delivering trainings for the administration and by the Bureau for the Development of Education for the purposes of delivering trainings for the teachers. It is based on MOODLE (Modular Open Oriented Dynamic Learning Environment – MOODLE) and it is additionally upgraded in order to support multi-tenancy, i.e. it enables various schools/institutions to have their own virtual instance in the system with a possibility of adapting it according to their needs – design, colors, logo and its administration.

  EPISTUM is a web-based platform designed to provide the educators, the administrators and the students with a unique, robust, safe and integrated system for creating personalized learning environments. It enables an easy upload and sharing of materials, it includes online discussions and conversations, it offers tests/quizzes, surveys and glossaries, collecting and examining tasks and entering grades. The system has been planned to integrate the existing standards in the sphere of e-learning (ARIADNE, ADL, SCORM, IMS, IEEE LTSC, AICC, DCMI) and it supports real time delivery of online classes.

  The modularity and the openness of the platform ensure a simple and fast adjustment of the settings and integration with other systems and registries for the needs of the NPDE. For the needs of distance learning, it is indispensable to integrate this system with other systems in order to obtain the data that they comprise. The main systems that comprise the data required for this system are as follows: the electronic school administration work system (ESARU) and the e-class register system (ednevnik.edu.mk), which comprise data on the teachers and the students, the schools, the lesson plans, etc. The system has already been prepared to use the Single Sign On – SSO system for the teachers from the e-class register system.

In order to understand the experiences of the teachers in terms of distance education, there is ongoing preparatory work on **an analysis of the use of distance learning under circumstances of a health crisis**.

The Ministry of Education and Science and the Bureau for the Development of Education, as the main users, supported by the UNICEF office in the Republic of North Macedonia and the Reactor – research in action, have been actively implementing a comprehensive research in the primary and secondary schools. The research is related to the health crisis arising from COVID-19 which, during the period March-June 2020, had a significant impact on the manner in which the instruction and education

process were implemented in our country. The main goal of the research was so summarize all the relevant experiences and assess the overall impact of the COVID-19 pandemic on the educational process in the country. By involving all the stakeholders (service users and providers in the education sector): principals, teachers, parents and students, this research is expected to provide a direct insight into the various experiences and the important aspects of the distance learning.

The research is being conducted in two phases. The first phase of the research was implemented during the period from 25th June until 5th July 2020 and it was aimed at providing an insight into the initial personal experiences with the educational process in the period after the closing of the schools, or more precisely after 10th March until the end of the school year 2019 – 2020. The second phase of the research is aimed to summarize all the experiences from the beginning of the new school year.

1.4. Experiences in creating and using digital content

E-textbooks. This portal (https://www.e-ucebnici.mon.gov.mk/) constitutes a digital library for storing, browsing and viewing electronic textbooks intended primarily for the students from primary and secondary schools, as well as for their teachers and parents. The idea behind the establishing of the portal is to provide the students with free-of-charge downloading of the textbooks so as to be able to learn the educational contents in an innovative and interesting manner, while the teachers would be enabled to prepare and present the teaching material with the help of information technologies. Initially, the textbooks were published in the form of e-books and downloaded in a pdf format.

The textbooks have been divided into groups for primary and secondary education, while secondary education has been divided into general and vocational secondary education. However, only those textbooks that have been approved for use at the primary and secondary schools have been published, not including the textbooks which the Department for the Procurement of Textbooks is unable to publish due to copyrights protection. At the moment of the creation of this document, 282 textbooks out of the total number of 970 were available for downloading from the portal.

Even though the idea of the portal is aimed at making the e-textbooks available, still, some consideration should be given to the improvement of the entire concept of e-textbooks; thence, in the future, textbooks should be created in the form of an e-book, as well as audio books which are of special significance for visually impaired children, dyslexic children, etc., wherein such books should be available through the NPDE. Also there is a need to develop 'interactive' textbooks and working materials for the students, instead of just copying the printed versions into an electronic format and, certainly, a solution should be found for all the textbooks approved by the MoES to be available and downloadable from the portal.

Video lessons. The Bureau for the Development of Education through the Eduino portal, during the period from March until June 2020, established a system for creating and cataloguing video lessons according to the teaching contents and their quality verification and control. By the end of the school year 1,740 video lessons were uploaded which were accessed by more than 300,000 users. The video lessons were developed in five languages of instruction (most of them in Macedonian and Albanian) and they comprise: two age groups (3 - 4 years and 4 – 6 years) and four development areas (speech

and language, happy maths, science – getting to know and understanding the environment, arts – visual arts and music) in pre-school education, all grades and teaching subjects from primary education and a part of the contents from secondary education.

Skoool.mk - The Skoool portal comprises 512 e-contents such as simulations, short lessons and notes in the sphere of science and maths for primary and secondary education, which have been translated and adapted in accordance with the national curricula. They are expected to be used and integrated in the NPDE.

1.5. Human resources

The human resources are of crucial importance for the purposes of an unhindered delivery of teaching, involving not only the teachers, but also all the other staff that provides support and assistance and ensures that the conditions for delivering the teaching are met.

This process includes:

- approximately 18 272 teachers involved in primary education,
- approximately 7 476 teachers involved in secondary education,
- approximately 1 000 teachers delivering classes in information technology and related subjects in primary and secondary education,
- approximately 100 administrators employed at the Ministry of Information Society and Administration, distributed regionally throughout the country, who are tasked with providing support to the schools for an unhindered operation of the internet and the equipment, their upgrading and other types of assistance.

The rapid growth and the innovations in the sphere of information technologies, especially under circumstances of a pandemic caused by COVID-19, clearly imposes an imperative for increasing and improving the IT competencies of the entire teaching staff and other support staff. This need has been insufficiently covered with the existing and tailor-made trainings on various topics, including also e-tests.

2. Introduction of a national platform[17] for Distance Education (NPDE)

There are three different global approaches to distance education. In terms of the manners in which the technologies, tools and procedures can be used in the educational process, the approaches are the following:

- **Technology integration** – –technology in teaching is integrated in the delivery of traditional classes. This approach should be applied during the regular classes whereby the students and the teachers would be using IT for the purposes of more easily achieving the learning objectives.
- **Blended approach** – parts of the classes are delivered in a traditional classroom, while other parts are delivered through distance education tools. The blended approach may also be used during

[17] **Learning platform** is an integrated set of interactive network services that enable teachers, students, parents, and anyone else involved in education to have access to information, tools, and resources for support and enhancement of the delivery and management of the educational process.

the regular classes, wherein certain tools and materials would be available 24/7, as well as under circumstances when the physical presence of the students is not mandatory.

- **Total conversion** – the traditional, classic education and training are fully converted into one or more distance education formats. Total conversion is an approach used in situations such as the one we are currently faced with when the physical presence of the students is impossible and the classes are delivered completely online.

Having regard to the afore-stated approaches to distance education, it is hereby proposed to establish a distance learning system that would combine all of the stated approaches and that would be contingent on the establishment of a national platform.

The main tasks of the national platform for distance education (NPDE) are as follows:

- supporting the teaching process at school and during distance learning,
- monitoring the students' achievements,
- professional development of teachers and school support staff,
- exchanging documents, experiences and ideas,
- networking teachers, students, schools and educational institutions,
- informing the parents regarding the activities at the school and regarding the students.

2.1. Pillars of distance learning

NPDE is to ensure a safe, secure and unified (at the same level and with the same features) implementation of the educational process at the primary and secondary schools on the entire territory of the country, while offering equal opportunities and access to all participants in the process, both under emergency and under normal/ordinary circumstances.

The main pillars of the distance education process are as follows: infrastructure, a distance education platform (its establishment at a national level is the subject matter of this document), digital contents and organizational prerequisites.

- **Infrastructure** denotes the infrastructure required for the operation of the platform and the infrastructure required for the users of the platform.
  - **Hardware.** The hardware infrastructure should have a sufficient capacity in order to support the unhindered operation of the national platform for distance education under circumstances of a simultaneous accesses thereto by all the teachers and students at the primary and secondary schools. It depends on the features and the performances of the platform, but it should also include an assistive technology where necessary.
  - **Internet access.** Internet access is one of the main prerequisites for the functioning of distance education. To that end, it is necessary for all the users of the NPDE (students, teachers, parents, employees at the MoES, BDE, VET Center, SEI, SEC, the municipalities) to have internet access. The location at which the NPDE will be placed should have internet access with a sufficient capacity in order to meet the needs of all platform users.
  - **Access to personal devices – computers.** Computer access is one of the main prerequisites for an effective and inclusive implementation of distance education. The NPDE and its

resources should be adjusted for access also from mobile phones/tables, i.e. devices that feature some of the existing web browsers. Consideration should be given to the fact that a personal device is indispensable for every student in order to be able to perform all activities: participate in classes, read contents, do homework, take tests, etc.

- **Digital contents (e-contents)**[18]
  - **The development of digital contents** should be in line with the best worldwide practices in terms of the development of digital teaching materials while using innovative methods (such as: interaction, gamification, personalization) and generally accepted formats in accordance with the existing international standards on digital teaching contents.
  - **Need for having e-textbooks available on the NPDE which are MoES approved, in a PDF format and in an e-book format.**
- **Organizational prerequisites**
  - **Connection to other systems, registries and databases.**

    The distance learning system requires exchanging data with external systems, such as: the ESARU system, with which data on the students, teachers, parents, teaching plans and programmes are exchanged; the e-class register system, with which data on the e-mail addresses of the teachers are exchanged; the Central Population Registry, with which basic data on natural persons are exchanged; the Human Resources Management Information System, which is the registry of all employees in the public sector; the existing learning systems, as well as other systems.
  - **Trainings for the teachers and the administrators at the schools**

    The introduction of any information system does not yield results without training its users, whereby, in addition to knowledge and skills related to its use, confidence will also be acquired so that each of them, with their own experience, is able to find the best way of accepting the system and integrating it in their professional duties. The training should provide a basis for the teachers to primarily enhance and facilitate their work with the system, and not perceive it as an additional burden.
  - **Establishing an organizational unit at the MoES and the BDE for the maintenance of the NPDE**

    The maintenance of a functional national system and the support for its unhindered use by the teachers and the students should inevitably include the existence of a dedicated team that will be the owner of the system. The team of this unit will have the task to ensure the implementation of the system in accordance with the laws, its continuous flawless operation and regular technical maintenance, as well as to provide proposals for amending the relevant legal regulations, implementing adequate platform upgrades, conducting analyses, preparing reports, defining usage plans, etc.
  - **Definition of strategic priorities for digital skills at a national level**

    At a time of digitalization, the digital skills of the population, including the various target audiences, are of vital importance and constitute an area which is highly prioritized in the countries throughout the world. The definition of the Macedonian strategic priorities for

[18] **E-content** (digital content) means educational content in a digital format, which can be comprised of the following categories of elements: presentations, interactive presentations, animations, simulations, video recordings, audio recordings, diagrams, maps, texts, quizzes, tests.

digital skills, at a national level, would provide clear directions in terms of the measures that are to be taken, the parties involved, the dynamics and the required budget.

2.2. NPDE components

The national platform for distance education will be able to meet the expectations and challenges if it has at least the following **components** (building-blocks):

- **User Management.** The users of the system should be managed in a way that depends on their roles. Data on each user should be protected by security measures, in accordance with the law. They should be available to the user and the users connected thereto (parents, teachers). Entry of new users, deactivating, changing data, roll-out, resetting passwords and other activities must be enabled in the platform.
- **Management of roles and permissions/privileges.** A role is a set of system-defined permissions that can be assigned to specific users in specific terms and contexts. This, in turn, defines the user's ability to perform a specific activity at a specific location in the system. The most common examples are the roles: student, teacher, administrator, moderator, and author.
- **Management of curricula/teaching units.** In the teaching units, teachers can add learning materials and activities for their students, in accordance with the curricula and the teaching plans for a certain type and level of education. Teaching units can be created by administrators, authors of teaching units or other roles. After they are uploaded or created, teachers can add contents and reorganize them according to the teaching needs. Teaching units should enable the option to include tests for the units.
- **Learning management.** Connection of the users: students - teachers - classes should be provided in order to be able to monitor the learning status of the students and their progress.
- **Document management.** The platform should enable the teacher to easily present the teaching materials to his/her students. These materials can be in files of various forms, such as: text documents, presentations etc. For some forms, the students should have the appropriate software to be able to open them. Documents can be shown on one page, as individual documents or organized in a folder structure. For example, one teacher will share a single document in PDF format, but another teacher can create a folder of documents that students need to download for learning or completing.
- **Creating backup copies.** The system, user databases and e-contents should be saved in automatic backups for security reasons, with the possibility of adjusting the dynamics and the way of creating backup copies.
- **Data management for reporting purposes.** Reports are an important part of the educational process and include reports for students and parents, reports at different levels: classes, years, schools, teachers and other criteria. They can be regular, planned and pre-defined reports or ad hoc reports for various needs. This component is tasked with keeping up-to-date and quality data, at a secure location, with fast data access.
- **Real-time teaching.** The platform should provide the possibility for real-time teaching.
- **Monitoring the professional development of teachers and school support staff.** The functionalities required for this component are covered in the previous components, but are adapted for providing and monitoring the professional development of the teachers. They should

be adapted for monitoring by providing e-content and e-training for teachers and school support staff, as well as defining appropriate roles and privileges.

2.3. Features and functionalities of the NPDE

NPDE should have the following **features**:

- To support different types of standards for e-contents: SCORM[19], pdf, ppt*, doc*, xls*, ods but also other formats for video and audio recordings.
- To be easy and simple to set in a working mode.
- To be simple and intuitive to use.
- To be flexible to adjust, especially in cases of increasing number of users and teaching materials.
- To be interoperable, i.e. to be able to exchange data and documents with other systems (for example: ESARU), applications/modules (for example: video conferences, webinars) and registers (databases, for example: e-class register).
- To provide a single login system for the users to be able to access contents from various sources approved by the BDE.
- To enable easy management of add-ons and plugins.
- To support open standards.
- To have the possibility for incorporating external materials and contents.
- To comply with the standards for access to web content for people with disabilities – Web Content Accessibility Guidelines (WCAG 2.0[20]).

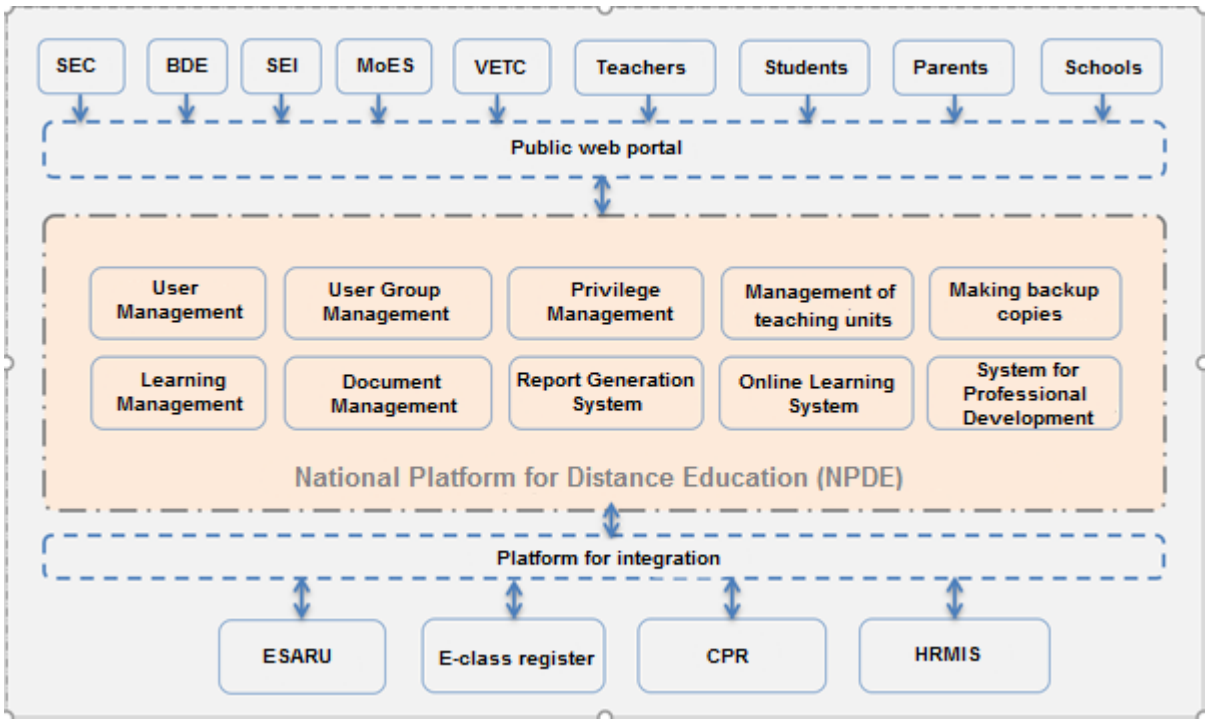
The platform should have the following **functionalities**:

- Supports multilingualism at a platform level.
- Secure user identification and authentication.
- Massive import of users, massive assignment of tasks/training, etc.
- Enables personalized dashboard and personalized learning.
- Sending and receiving notifications.
- Calendar of events.
- Monitoring the student's progress.
- Collaborative tools.
- Adjustable design and layout of objects on the interface.

The graphic presentation of NPDE is shown on the following diagram:

[19] SCORM (Shareable Content Object Reference Model – SCORM) is a collection of standards and specifications for web-based electronic educational technologies (called e-learning or e-training or e-content).

[20] http://wcag.mioa.gov.mk/



Establishing a national platform for distance education is a serious process of transformation of the current model of education and the whole approach to teaching and learning not only in terms of using technology but also in terms of introducing a “new pedagogy”. Therefore, full commitment is needed from the educational institutions - carriers of the whole process, as well as of all participants and stakeholders in the educational process.

The challenges are great, but even greater and more important is the idea and desire to build a modern, flexible and quality education system tailored to the needs of every student in our country.

Distance teaching is implemented in a completely new environment, which is a big change compared to classroom teaching, and therefore it has its own specifics. The conceptual system remains mostly the same as the classroom teaching, but functionally there are large differences and shifts within the teaching schedule and functions. Thus, several **features** of distance teaching can be identified.

- The "didactic triangle" and the three key factors of teaching (teacher - content - student) in distance teaching can be said to become a "didactic pentagon" (teacher - content - student - parent - technology), because in the distance teaching system with primary and secondary school students, the parent and the technology become factors without which teaching cannot be successfully implemented. The role of the teacher is also significantly changed. The teacher in the classic teaching is mainly a lecturer (despite the efforts for introducing modern approaches to be a facilitator of learning), while in the distance teaching system, is primarily a mentor (supporter, guide), and only occasionally a lecturer. Parents take over a whole range of the school's organizational activities, and for that reason the education system has to find solutions, through the distance learning system and the preparatory processes, to: (1) optimize the role of the parent and (2) minimize the risk - the quality of learning to depend on the readiness and ability of the parent to teach their child.
- There is a change in the preparations for the teaching itself. In the classroom teaching, the teacher prepares for the teaching, taking into account the complete "ambience" in the classroom, while in distance learning the teacher's preparation focuses, primarily, on the preparation of the content. The whole distance learning system largely depends on the quality of the content that the teachers prepare and send to the students. The teaching contents must be designed in accordance with the model of programmed or semi-programmed learning, for which realistically the teachers are not sufficiently prepared.
- The distance teaching system largely neglects the upbringing dimension of the teaching and the school and that dimension is taken over by the parents. The upbringing dimension is now mainly focused on the attitude towards work, time, etc.
- Technology becomes fundamental in a manner that there is no more teaching without it.

These are some of the specifics of the "new pedagogy" of distance teaching that should be taken into account in the establishing of new distance teaching system or using the national platform in the everyday school work.

Experiences with innovative approaches to the use of ICT in education can be the basis for creating the "new pedagogy" of distance teaching. The OECD Educational and Innovation Research entitled "Teachers as Designers of Learning Environment"[21] presents experiences and provides guidelines for using innovative approaches that can be adequately adapted to distance learning.

Thus, the document offers six (6) groups of pedagogical approaches.

[21] https://read.oecd-ilibrary.org/education/teachers-as-designers-of-learning-environments_9789264085374-en#page24

- **Blended learning**. This pedagogical approach combines students' work and teaching, adjusts their order, and it is strongly based on digital resources. The aim is to make the learning more appealing and coherent for the students and to free the teachers from routine practice in favour of interactive and intensive classroom activities. There are three forms in this group of pedagogical approaches:
  1) inverted/flipped classroom – where the students first work on the materials and then, in contact with the teachers, they practice, further explain and deepen the comprehension/knowledge;
  2) lab-based model – where the students rotate between the school laboratory and the classroom, applying the content through face-to-face interaction with the teachers;
  3) in-class blending – where some students follow a customized schedule rotating between online and face-to-face lectures.
- **Game based learning**. It is based on the ways in which games can attract the interest of the students and facilitate the learning. This approach has been used successfully in a number of subjects, such as: Math, Science, Physical Education, languages, (mother tongue and foreign languages), History, Music/Art. There are two main pedagogical components: mechanical elements (fast feedback, goals, participation and developmental challenge) and emotional elements (narratives and identities, collaboration and competition). There are many digital resources with game elements that are interesting to students and can be easily incorporated into the distance learning activities.
- **Computational thinking**. It develops problem-solving abilities through the principles of computer science. Techniques of this approach include approximate solutions, parallel processing, model checking, and search strategies. The basic elements of this approach are: logical reasoning, decomposition, algorithms, abstraction and patterns.
- **Experiential learning**. It is implemented through active experience, experimentation and thinking. This approach combines contents and processes, reduces leadership, promotes engagement, provides links between the learning and the wider environment, and generates insights from the experience. The four components of this approach are: concrete experience, reflective observation, abstract conceptualization, and active experimentation.
- **Embodied learning.** It connects the physical, the artistic, the emotional and the social. The research considers three approaches: school-based physical culture, integrated art learning, and creator culture.
- **Multiliteracies and discussion-based teaching.** It aims to develop cultural distance and critical capacities and addresses a series of practices and principles rather than a single pedagogical approach.

In modern distance education, the use of ICT is inevitable, but although it offers many opportunities, it does not in itself improve learning. The "new pedagogy" of distance teaching means a good understanding of the learning processes and their connection to the potentials of innovative learning approaches by use of digital technology. Attention should be paid not only to the advantages it offers but also to find the most appropriate approach and ways to deal with the challenges of the "new pedagogy" so that it would continue, in addition to knowledge and skills, to develop positive values and attitudes in students towards learning and life.

1. Organization of distance teaching

Distance education requires a very different organization both at the level of the whole school and at the level of the individual teacher. Not all educational activities can be adapted to distance education with the same level of success. On the other hand, there is a series of learning activities that can be implemented more effectively without the physical presence of all participants in the educational process.

1.1. Basic guidelines for planning distance teaching

In order to be able to successfully implement distance teaching and learning, it is necessary to make a good planning of the whole process. Planning is primarily expected to start at the school level, taking into account several factors, such as: whether it will be planned to implement distance teaching or will it be combined with teaching with physical presence of the students (or how the platform will be used in the regular teaching process), the period for which distance teaching is planned, the prerequisites that are taken into account (available technology for teachers and students, expected / possible or impossible support from parents, balance of synchronous and asynchronous activities[22], etc.).

In view of the fact that the approach that teachers use in planning classroom teaching may not be fully applicable to distance learning, it is necessary for them to adapt the planning to the distance teaching, where emphasis must also be placed on what the students need to master/learn.

Once the teacher determines the learning outcomes (what students need to learn) based on the curriculum, the planning will determine the appropriate manner (activities, methods and techniques, use of certain tools, assets, etc.) how it will be implemented remotely, how will the teacher monitor the progress and assessment of students and envisage ways to implement activities with students and parents.

The teacher should also encourage students to make their own work plans, possibly together with their parents, as distance learning increases the involvement of parents/guardians in their children's learning, and students can choose their own "learning paths", approaches and environments according to their current situation.

Distance learning planning will be successful if everyone uses it to support learning (teachers, students, and parents).

It is most important that the planning envisages formative assessment, monitoring, evaluation and achievement of certain goals that will make the learning "visible", giving feedback, so that students will know when the learning outcomes are achieved and they will be "documented".

[22] Synchronous activities are those when teachers and students communicate in a real time via electronic media verbally or in writing (for example, video call/audio call, chat).
Asynchronous activities are those when the communication does not take place in a real time, but sequentially. It can be a verbal message (for example, sending a video / audio message) or a text message (for example, sending/setting up a platform, documents with work instructions), but it can also be a request for additional information about a completed assignment by phone.

1.2. Organizing the teaching - preparing a schedule of lessons for distance learning

When it comes to the way of organizing the teaching, i.e. preparing the schedule for distance learning, that activity should be planned by each school individually (depending on the number of students, the language/languages of instruction, the average achievement level of the students and other factors) and to choose the most appropriate way in which distance teaching will be implemented, as follows:

- the school should follow the schedule that is made for a specific school year (when teaching is performed in school) – each teacher teaches in accordance with the annual schedule of the grades/classes (for example: this method may be applicable to secondary schools, but also to primary schools with a large number of classes and a large number of students in the class, for example from 25 to 30 students);
- the school should make a new schedule that will be valid only for distance teaching (or for blended teaching, which will be implemented partly in school and partly from a distance) and which will allow grouping of classes from the same grade, i.e. classes from the same year , where the teacher will teach the classes from the same grade/classes from the same year in which he/she teaches at the same time (for example: this method may be applicable for primary schools that have a smaller number of classes and classes with a small number students, combined classes, or in some of the vocational secondary schools that have classes with a small number of students).

When choosing the schedule according to which the distance teaching will be implemented, first of all, one should take into account the maintenance of the quality of teaching and the possibility for the students to be motivated and actively involved in it.

1.3. Time of implementation of distance teaching

During distance learning special attention should be paid to the active engagement of students. It is necessary to follow the defined schedule for distance learning, the implementation of the teaching process, the teaching contents, and the assignments that students receive for independent work at a certain time (in accordance with the schedule). This is important for students to be able to organize their time, to “feel” that they are having “distance teaching” in a certain time and to be able to plan their free time.

The distance teaching is recommended to be implemented in the morning, thus enabling the students to study independently and complete the received assignments in the afternoon. Of course, every school is given the possibility, depending on the conditions, to make its own schedule for implementation of the teaching process, and it will have to inform the students and the parents about the schedule in a timely manner.

The time envisaged for the teaching process in the course of one day should be adequate to the age and the attention span of the students. Consequently, students in the lower grades of primary education should have maximum 120 minutes of distance teaching and learning during the day

(regardless of whether they are synchronous or asynchronous activities), students in the higher grades of primary education from 120 to 180 minutes, while secondary school students from 180 to 240 minutes[23]. This means that when preparing the activities, teachers will take into account these time periods and will synchronize the schedule and duration of the lessons/activities by days, at school level.

Schools can recommend time for different activities, such as: reading, creative activities/writing, research, etc., and also, depending on the age of the students, envisage a specific time (from 30 minutes for students from lower grades of primary education, 60 minutes for students from higher grades of primary education, up to 90 minutes for students in secondary schools) for doing homework, as well as time for repetition, filling in reflective journals, etc.

It is recommended that one class of distance teaching should not be longer than 30 minutes, and that students should have at least 5 to 10 minutes break between each class.

2. Implementation of teaching

Teachers should adjust the planning of the teaching and the time, the methods and the ways for implementation of distance teaching. It is recommended that the presentation of a new teaching content not to be longer than half of the scheduled time of the class, i.e. about 15 minutes (regardless of whether the teacher will present own lessons or use the lessons from the national platform), and the teacher should use the remaining class minutes (10 - 15 minutes) to communicate with the students on a topic that is important at that moment and for which the students have shown interest, for questions from students, additional explanations, self-assessment, giving feedback, etc.

In order to encourage and support self-regulated learning, it is recommended that teachers assign students long-term activities (projects) in line with their individual interests, rather than short-term activities. In this way students develop more complex competencies, and the teacher can focus on tracking the student progress and providing guidance to the students. Such assignments should be well-structured in terms of content and time, and the progress should be monitored through completing assignments and achieving goals within agreed deadlines.

Regarding the working method during the synchronous activities, the teacher should inform the students and agree the “rules” with them (how to ask a question, how to ask for the floor, how long should a presentation last, etc.). There should be rules for the asynchronous activities, as well - where the completed assignments are uploaded, where and how questions are asked, where and how the questions asked by the teacher and/or classmates are answered, when and how feedback is received.

All materials for a certain class (worksheets, homework, presentations / plan of certain teaching contents, links to recorded video lessons) are uploaded by the teacher on the platform no later than the end of the current day when the specific content is implemented. If the teacher has prepared

[23] The envisaged time does not include the student’s independent activities.

the material, if it is appropriate, he/she can upload it a few days before the implementation of the teaching content.

Homework/independent assignments for students assigned by the teacher should be tailored according to the age of the students (the time required for their completion should not be more than half an hour for the youngest students from the first period of the primary school, not more than one hour for students up to the end of the primary school, i.e. not more than an hour and a half for the students in the secondary schools, except when it comes to research projects or some practical work that requires a longer time to complete).

The number of classes per specific subject shall be in accordance with the defined teaching plan and curriculum for each teaching subject.

During the implementation of the teaching, the teacher should use a system for recording the attendance of the students in the class, as well as regular attendance and the timeliness in the fulfillment of the assignments.

Each teacher needs to develop a strategy and identify ways to support students with disabilities. This requires excellent coordination among teachers, assistants and school support staff. Depending on the needs of the student, it should be determined what work pace is the most appropriate, whether to focus more on synchronous than asynchronous lessons, how the tasks can be modified and what type of assistive technology is needed (special font, reader, special click, joystick, etc.).

2.1. Using e-content

The teacher uses e-content while implementing the distance learning or while using the platform for implementation of classroom teaching. The teacher can prepare/adapt contents appropriate for the subject he/she teaches or use the prepared e-contents that are available on the platform.

E-content is used in order to stimulate the students' interest in the subject, to make it easier to remember and understand the specific content, as well as to apply the acquired knowledge. E-content that the teacher creates or selects should be multimedial, i.e. it should have text, animation, sound, presentation, be available on the platform used in the classroom, but also be available for distance learning. The created e-content should be adequate to the age of the students and correspond to the goals/expected outcomes of the curriculum.

E-content can generally be divided according to the elements from a technical point of view and the elements from a user point of view. From a technical point of view, e-content can consists of the following categories of elements:

- **presentations,**
- **interactive presentations,**
- **animations,**
- **simulations,**
- **video records,**
- **audio records,**
- **diagrams,**
- **maps,**
- **texts.**

E-contents (such as: text presentations, audio and video presentations and other simpler e-content) are prepared and uploaded by the teacher on the platform and they can be also available from the school during the implementation of the regular teaching, as well as for implementation of distance teaching and learning.

Also, more complex e-contents purchased and approved by the Bureau for Development of Education, the Vocational Education and Training Centre and the State Examination Centre, which are in accordance with the curricula, shall be uploaded on the platform aiming to "replace" lecturing of certain teaching unit (recorded video lectures by teachers accompanied by a presentation) or to expand and deepen the students' knowledge, improve the students' achievements, check the students' knowledge and achievements. These e-contents are also available to teachers and students in the school, as well as during the organization and implementation of distance teaching and learning.

3. Monitoring and assessment of students in distance learning

The strategies for evaluating student achievement/progress in distance teaching should be aligned with the learning outcomes of the curriculum. They also depend on the choice of teaching methods and assessment instruments, as well as assessment tools and models.

3.1. Formative assessment in distance teaching

In distance learning, the opportunities for direct verbal and visual contact and control of the situation are significantly reduced. Therefore, it is necessary to adjust the formative and summative assessment to the new situation and to give students **clear guidelines regarding the assessment** (how to study on their own, how to check how much they have learned, what evidence to gather, how the learned material will be checked, how the grade will be formed).

Teaching in a virtual classroom is a challenge and an opportunity to make a step forward in the assessment in order to emphasize the more complex cognitive processes (analysis, synthesis,

evaluation) instead of acquiring factual knowledge, which is, in fact, the goal of education. It also means that in distance teaching and assessment **the emphasis should be on what is important**[24].

For successful distance learning students need information about their success, as well as guidance for improvement. The formative assessment provides them with such information, while helping the teacher to adjust the teaching activities and thus improve student learning. In formative distance assessment, feedback is often not provided synchronously (at the same time), however, when provided later, it can be more detailed and more specific. Formative assessment via the Internet (online) has the same advantages as in a real classroom.

Distance learning is a great opportunity for the students to take responsibility for their own learning, to plan and train for independent learning, leaving them more time and opportunities to organize their own learning, and to improve their work after the obtained comments.

The most important steps in formative assessment can be easily adapted to the situation in the virtual classroom, almost independently of the electronic tools used in the teaching process.

- **Getting acquainted with the learning goals and the expected learning outcomes.** During synchronous activities, the students are verbally informed about what they will learn and what they will be able to do at the end of one or more activities. In asynchronous activities, the students should read/be told in writing or via a recorded video/audio message what they need to learn, what steps they need to take in learning and how they will eventually show that they have learned. It is good to share this information with the parents/guardians in order to ensure that they are more involved in their child's learning and to overcome any possible misunderstandings in terms of the assessment due to the differences in the expectations about what needs to be learned.
- **Asking questions and giving assignments that enable insight in students' understanding of what is being learned.** During the synchronous activities, students (individually or the whole group) can be asked short questions (for example: answers to short questions with true – false indications, summarizing the previously studied contents in one sentence). Direct communication (by telephone or chat) can be also used to check what the student does or doesn't know, and to provide them in a timely manner with learning guidelines, additional materials, to connect the student with other students, etc. In asynchronous activities, the questions can be formed more thoroughly, and thus, in addition to the questions that check the student's level of knowledge and the manner of learning, there may be additional questions such as: What was the most important thing that you learned?; What is not clear enough to you?
- **Using various checking methods and techniques.** All methods based on assessment of written papers are applied (essays, some types of projects, presentations, tests), and especially applicable are the reflective journals. However, there are limitations to using certain monitoring

[24] The facts are easily available via various electronic media, which the students at the end of the primary and at the beginning of the secondary education already use successfully, but they need to learn how to choose relevant sources, how to compare, analyse and evaluate information and based on that to draw conclusions and form attitudes.

methods, for example: observing practical performances. It is advisable not to use too many assessment techniques in order to establish a certain routine in using the selected techniques.

- **Involvement of the students in the assessment (self-assessment and peer-assessment) for the purpose of peer-to-peer learning.** Peer-assessment should be included in the synchronous activities and in some types of asynchronous activities (for example: closed discussion groups on social networks, written comments on written works by the classmates). Self-assessment is more adequate for the written assignments by answering self-reflection questions such as: I am most satisfied with... I think I can do better... The next thing I will do is...

3.2. Feedback during distance learning

Distance learning feedback is especially important in order to maintain the motivation and continuity in learning. At the beginning, the teacher, based on the students' available technical possibilities, as well as his/her own abilities and competencies, should determine the most appropriate ways to communicate with the students, and consequently – to provide feedback.

Feedback can be provided in various forms. When providing asynchronous feedback, it can be in:

- **Written form** - through various options for commenting in the document that the student sends or separately in a separate document that the student receives back through the established mechanism of communication (online teaching platform, social network, e-mail, etc.). Written feedback is a more adequate method for certain subjects (for example: Mathematics, Natural Sciences) and certain types of assignments (for example: math problems, test questions), but it can also be used successfully for other subjects as well (for example: Mother tongue/Foreign language, a social sciences subject) as well as in assessing essay questions.

- **Audio or video form** - The teacher can record the feedback and send it to the student in the form of a video or audio recording. This approach is adequate if the information is detailed and very specific and aims to particularly affect the social and emotional aspects of the motivation. At the same time, it is more likely to be properly understood, as it also includes non-verbal information (voice tone).

The teacher can easily include the documents/recordings that contain the feedback in the student's electronic portfolio and use them to monitor the student's progress, as well as for summative assessment.

When providing synchronous feedback, the **direct conversation with the student** over the telephone or online communication applications (provided by the platform or other applications used by the schools, etc.) is the most appropriate approach. As this way of providing feedback requires more time from the teacher, it is good for him/her to include individual sessions in the schedule for providing feedback in a certain part of the day or the week. Such sessions enable students to maintain contact and connection with the school and the feeling that teachers are available to give them guidance and support.

Feedback can also be provided at the whole class level in order to emphasize the progress or to point out certain challenges that all/most students face. Again, it can be in written or audio/video form.

In addition to the check of what has been learned and the achieved goals of the curriculum, it is good for the teacher to occasionally provide a possibility for the students to provide feedback on socio-emotional learning as well, by asking students for feedback regarding questions such as: What works well for them/what do they like in distance learning?; What can be improved?; What would they recommend? In that way the teacher will be able to adjust the way of working according to the needs and the capabilities of the students. This information can also be collected during synchronous sessions (for example: a class held via one of the meeting networks), so that during the class the teacher would ask the students to indicate in writing how much they understand the material they are learning, for example: by yes - no answers in the written communication field or by sending a direct message to the teacher.

Informing parents/guardians is a type of feedback for them given the expectations that they will be more involved in distance learning. The parents should be informed about the expectations from the students, the assignments they (will) receive, the success of their completion, the guidelines for further work. Parents are expected to be well informed about their child's learning. The teacher should especially try to also get in touch with the parents who do not show interest in their child's learning.

Self-reflection of the teacher is crucial for the improvement of distance education, as it enables the teachers to evaluate and improve the approaches they have used. The collected data on students' learning should be used to improve their learning and/or to improve the teaching process.

3.3. Summative assessment

Summative assessment is part of almost every type of formal education, regardless of the manner in which it is conducted. A particular challenge in the summative assessment in distance education is to ensure that it is valid and fair. There are experiences and ways to ensure quality summative assessment in distance teaching.

- **Validity** (checking all expected learning outcomes). It is ensured by checking only those expected outcomes that students were taught through distance learning. When choosing the assessment methods, the methods through which the students were taught are taken into account as well.
- **Reliability** (how much the grade reflects the student's achievements). A satisfactory degree of reliability of the grade in distance assessment can be ensured if authentic assignments are given that make finding ready-made answers in the teaching materials or other sources of information difficult. Also, it should be ensured that the completion of the assignments that check the knowledge and understanding of the facts is time contolled. In addition, subsequently, in direct contact, the teacher may request additional explanations to ensure the reliability of the answers. In case of synchronous teaching, behavioral control can also be provided. In order to ensure greater reliability of the summative grades, it is recommended to use the information gathered

from the formative assessment (assessment of the best papers/representative portfolio) in their formation.

- **Objectivity** (would the student receive the same grade in case of re-assessment). The objectivity of the grades is ensured if the pre-prepared specific assessment criteria are consistently respected (defined criteria for essay questions, unambiguous answers to test assignments) and consistently applied by the teacher. If the project or essay assessment rubrics or the score list for short essay answers are shared with the students and the parents in advance, the confidence of the students and the parents that the assessment is objective will increase as well.

- **Fairness / impartiality.** The objective assessment is at the same time impartial/fair (the assessment is not affected by other factors that are not related to what is being assessed, for example: gender, social background). However, in distance assessment, if all students do not have equally good electronic devices, it can affect the quality of the assignment (for example: some have a computer and some have only a mobile phone), so the summative assessment assignments should be such as not to give preference to those who have better devices (for example: technical presentation should not be a criterion or everyone should take the test in the same way - either on paper or on a computer). Teacher's impressions of the students must not influence the grade. Sometimes distance learning suits some students who have previously achieved poorer results and who may surprise with the quality of their works. It should be properly valued.

- **Transparency/clarity and publicity** (students are acquainted with the manner of assessment). Students and parents should be acquainted with the expected students' learnig outcomes/achievements and how they will be assessed: by what assignments, what will be the criteria, how will they be scored. The teacher can make a table of evidence/products that the student will submit as part of the electronic portfolio that will be assessed - what they need to present, by when and how to submit it and to inform the students and parents about it (by uploading on the determined platform, by sending e-mail or via a group on a specific application). Students should have access to the rubrics and criteria for assessment of the essays, to be provided with practice tests with essay questions similar to those that will be used. They should also be informed on the impact that the achievements from the essay and/or project assignment, from the best works in the electronic portfolio or the possible annual test will have on the summative assessment. It is good to also give some weight to both the regularity and the fulfillment of the assignments.

External measurements and examinations at the national level should be adapted for online administration for which appropriate protocols will be prepared.

3.4. Assessment methods and techniques in distance teaching

The most common digital techniques that teachers can use in order to evaluate students' progress and achievement, i.e., the most common digital techniques for formative and summative assessment, depending on the performances of the respective platform, are:

- **Objective tests with multiple choice questions.** All types of objective tests with offered answers (multiple choice, choice of correct answer from two offered, connection tests) are easily adaptable for online assessment. The advantage of such tests is that they are easy to administer. The assessment is completely objective, the results are immediately available to the student and the teacher. It is easy to make analysis of the correctly and incorrectly solved assignments, the type of errors, etc.
- **Short answer tests.** These test assignments require from the student to complete a word or a phrase as an answer to a direct question or to enter a word or phrase left out of a statement. They are easy to prepare and not very difficult to assess. Just like the tests with offered answers, there are many tools available for generating short answer tests.
- **Essay questions.** Essays enable evaluation of knowledge, abilities and skills for higher level learning. However, their checking by the teachers takes a lot of time. The essay that will be used for summative assessment is to be well thought out and all students must work on it synchronously, i.e. at the same previously determined time. If the essays are submitted online, it may be easier to control them by using a model answer evaluation scheme. One of the most important advantages of solving online essay questions for formative assessment is the possibility for the teacher to control the progress of the work and provide comments on the text posted by the student on the platform.
- **Online games.** Online games offer the students exciting opportunities to learn, while being convenient for monitoring the progress and assessment. They can provide creative environment in which the students can learn to experiment, collaborate and solve problems. They can be used in almost all subjects, and, above all, for formative assessment.
- **Student magazines, blogging and creating wiki.** Many platforms provide functionalities for student journalism, blogging or creating wiki. There are also free tools available on the internet. The magazine is a particularly useful tool for stimulating students' thinking, and the teachers can choose to evaluate the magazine entries using rubrics. Magazines are usually private, visible only to the teaching staff and to each individual student.

  Blogging is similar to the magazine, except that it has more features for providing access to information. One or more students can create private, semi-private or public blogs. Blogs can be assessed in the same way as magazines.

  Wiki are also tools that can be created by one or more students and can be designated as private, semi-private or public. Wiki are especially useful for group collaboration projects and are suitable for social constructivist learning.
- **The electronic-portfolio** is an essential tool in distance assessment because it allows the students to track their own progress, improve and document the progress. It allows them to store various types of works, including multimedia works. It allows the teacher to monitor the student, to assess him/her formatively and summatively and to document the assessment. The

online portfolio can be created using a variety of ICT tools. These tools allow students to write documents and upload photos, audio and video materials. All content can be tagged and, if necessary, shared on other tools and media. The most important advantage of creating a digital portfolio is the possibility to include various content, such as: movies, audio recordings, presentations, text, hyperlinks and animations. The use of online e-portfolio tools enables documenting student achievements in complex assignments where students are expected to create, compose, construct, design, generate, invent, and produce.

External measurements and exams often use objective test assignments, short-answer essay questions, and written essays accompanied by detailed and rigorous assessment guidelines.

4. Cooperation and support from parents/guardians in the implementation of distance teaching and learning

Given that in the distance learning process teachers are no longer physically present in order to be able to constantly guide and monitor the students' progress, they need to provide appropriate means of communication and explain to the students the learning goals/outcomes so that they can plan their own learning with the help of the parents or other support.

Most parents/guardians can be good facilitators in distance learning, but they can also create unnecessary barriers, for example - by teaching their children the way they learned in school many years ago. Therefore, it is very important to share with parents thoughts on how to best support students and give them recommendations to support and monitor learning (for example, by providing appropriate feedback).

Parents/guardians can get acquainted with the learning tools, specific methods and effective ways of asking questions. If there are several children in the family, the parents can be helped with learning guidelines for children of mixed ages. The parents/guardians who want to support their child but do not know how, can be offered simple checklists or tools to master certain content.

At the beginning of the year, the teacher should collect the contacts from the parents (telephone numbers, e-mail addresses, etc.) and agree the most adequate way of communication at the individual level and at the group/class level. Communication with parents can take place in different ways: initially via e-mail, telephone, social networks, chat rooms/channels, blogs, etc., and with the development of the national platform, via the determined communication channels on the platform.

First, the parents/guardians should be informed of the schedule and the time the student is expected to spend in distance teaching. Then, they should get acquainted with the most important goals and the expected outcomes from the curricula. The teacher should share information about the necessary teaching materials, where they can be found and how often they will be updated. In addition to the required materials, the teacher can share additional materials that the parents could use on their own to support their children's learning.

In addition to the class and subject teachers, the school support staff should also be included in the process of cooperation with the parents. The role of the parents in the process, above all, should be

supportive and encouraging, without special requirements in terms of the pedagogical skills. The parents should make sure that the student continuously attend the classes and know which representative of the school to contact if they face difficulties.

5. Support to teachers for implementation of distance teaching

Contrary to the realization of classroom teaching (using various modern strategies, methods, techniques and tools for teaching, monitoring and evaluating the student achievement), teachers in distance teaching are put in a situation where they need to adapt those strategies or find new strategies and methods in order to succeed in motivating, engaging and guiding the students in the learning process. To realize the distance teaching, the teachers need to deepen their understanding of the learning processes and to enrich their range of methods and techniques adequate to the "new pedagogy" of distance education, to develop their competencies for performing creative, supportive and tailored distance teaching for every student.

To develop into "21st century teachers" they need to be fully supported in the acquisition of competencies (both pedagogical and IT). Above all, it is necessary to provide basic conditions and technical means for performing quality distance teaching (computer, internet connection). Then, it is necessary to train the teachers to use the equipment, use the national platform, as well as to provide trainings for creating e-content, distance monitoring and assessment, etc. The technical support for the teachers should be provided by the school (by appointing a person for technical support of the teachers), by the local community (by providing equipment, internet connection), by the Ministry/Bureau for Development of Education/the Vocational Education and Training Center (by providing adequate trainings). The professional support for the teachers and the school support staff should be provided through accredited training programs by the Bureau for Development of Education, as well as through direct professional and advisory assistance by the advisors from the Bureau for Development of Education and the Vocational Education and Training Center.

The professional support for the teachers should be especially focused on providing trainings for:

- use of the platforms,
- development of e-contents,
- use of e-contents in the teaching process in school,
- realization of distance teaching,
- monitoring and assessment of the students in distance teaching.

It is necessary to localize and adopt the ISTE standards for the teachers, schools and students.

The work of the teachers and the fulfillment of their obligations regarding the distance teaching should be monitored and properly documented by the school management and the school support staff, as well as by the BDE, SEI and VET Center and should be provided with timely support from technical or pedagogical aspect.

6. Involvement and competencies of the educational institutions in distance learning

The successful realization of distance learning is conditioned by the readiness of the national educational institutions to provide support to the schools (the school directors, school support staff, teachers, students and parents) and other stakeholders in the educational process (for example: the legal entities for realization of practical training/the employers in the case of vocational education) for planning, preparation, organization, realization, evaluation and assessment of distance learning.

The development of a systemic solution for distance learning, which implies establishment of a national platform for primary and secondary education, requires planning the manners of involvement and development of appropriate tools, in accordance with the competencies of the institutions in the primary and/or secondary education such as: the Bureau for Development of Education, the Vocational Education and Training Center, the State Examination Center, the State Education Inspectorate, the Center for Adult Education as well as other institutions that have competencies in the primary and/or secondary education. The educational institutions should plan and organize some of their competencies defined by the relevant laws, through the established national platform as well, for example: monitoring, giving feedback and guidance and approval of recorded lessons by the teachers, the e-content, the tests; insight in the planning of the teachers, in the way of realization of the distance learning, etc. The national platform will provide the institutions not only with direct insight in the teaching process, monitoring the professional development of the teachers and the school support staff, but also leading the process of career advancement of teachers (planning, reviewing documents, giving adequate opinions and ranking the selected teachers for higher titles).

Successful realization of the new approach of "distance advisory and professional support", requires adequate equipment and training to be provided to the educational institutions and above all:

- To provide a spatial e-platform for each institution. This part of the platform will be used to set up digital content, tutorials, learning materials, simulations or videos of processes, products and services, a catalogue for professional development of the teachers, support for the schools (and companies) to establish and strengthen collaboration.
- To provide a multimedia center in each institution. To provide adequate specific equipment for the realization of web-based trainings, video conferences, webinars, and the like, as well as to adjust an adequate room with soundproofing, adequate lighting and the like.
- To strengthen the institutions with new professional associates and training of the existing staff for access, recording, attachment, etc. to the e-platform.

As a part of the institutions activities and preparations for distance learning, they within their competencies will have to prepare:

- guidelines/instructions for the manner and the form of realization of e-teaching for each type and level of education (teaching in the lower grades of primary education, teaching in the higher grades of primary education, high school education, vocational education, art education, especially guidelines and instructions for work with students with disabilities, etc.);

- guidelines/instructions for the so-called pastoral care and counseling - school support staff and teachers should have certain periods in the week to talk to the students regarding their condition and the challenges they face;
- guidelines/instructions for the manner and the form of realization of the advisory-consultative and mentoring-instructive support of the teachers (for each type and level of education, theoretical teaching, exercises and practical training in the vocational education and training);
- guidelines/instructions for monitoring and evaluating the student achievements through distance learning (including the manner of creating an e-portfolio for the students for exercises and practical training);
- guidelines/instructions for the manner and the form of evaluation of the work of the teacher for distance teaching.

Regarding the quality assurance of the digital materials and contents, cooperation between the institutions is needed, as well as cooperation with external experts in the field of information technology and distance learning in:

- The development of methodology for creating digital contents;
- Defining pedagogical and technical standards and recommendations for developing different types of digital materials while ensuring quality, compatibility with other content and the possibility of multiple use;
- Defining pedagogical and technical standards and recommendations for developing simulations of processes, products and services, as well as interactive digital contents for realization of laboratory exercises;
- Defining criteria, prescribing and implementing procedures for valuation of the distance learning materials;
- Defining a way of motivating the teachers and the mentors from companies for developing digital materials/contents/simulations/videos and the like.

Within their competencies, the institutions will organize promotional activities for distance learning and development of promotional materials for introducing the users to the manner, the conditions and the services that the distance learning platform offers.

With the development of the distance learning system, the manner of obtaining distance learning certificates will be gradually established and legally regulated not only for the students, but also for the teachers through their career advancement. In that direction, the following will be necessary:

- Formal/legal recognition of the electronic certificates/documents;
- Provision of certification of modules and trainings that are fully realized through distance learning;
- Regulation of the intellectual property rights of the digital materials/contents.