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IO3 - Practical Guide for Schools. Quality Framework for Integrating ICT in the Teaching-Learning Process

O3/A4 - National Field Research. Romania

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IO3 - Report. Conditions for the Integration of Digital Technology in Educational Practices in Romania

Introduction

The "*Conditions for the Integration of Digital Technology in Educational Practices in Romania*" National Report (IO3) together with the results of the online teacher survey (IO4) have the role to anchor the elaboration of the support tools, which will be offered to schools through the DECODE project, in the socio-educational context. The tools are: Guide for schools and other educational institutions; Quality Framework for ICT Integration in the Teaching and Learning Process, and a Teacher Training Program for the Integration of ICT in Educational Activities.

The report examines policies and practices in the field of ICT education identifying the main favourable and unfavourable conditions at national level, based on a qualitative research methodology. The report on Romanian context for is part of a transnational study, based on a joint research methodology and conducted through nationally validated instruments, involving four other European countries: Finland, the United Kingdom, Spain and Italy. The national reports, the transnational comparative report and the Guide for Educational Institutions are the products of the IO3 work package and are available on the project website (www.decode-net.eu).

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1. Research methodology

A qualitative methodology was developed to produce the national reports, based on in-depth interviews with relevant experts from each country and document analysis. Five key experts were interviewed in each participating country (Romania, Italy, Finland, the United Kingdom and Spain), who were selected from among the relevant stakeholders with expertise the topic of integration of ICT in the educational process: inspectors from the Ministry of Education National and within county school inspectorates. Research tools (in-depth interview grid and document analysis grid) have been developed by the Institute of Educational Sciences (Romania) and validated internationally by the project partners. The aim of the research is to provide relevant contextual information at national level, which facilitates the development of appropriate measures for national contexts and supports the pertinent integration of different information and communication technologies in the educational process.

Objectives of the research project:

1. To identify educational management mechanisms (at institutional, local and national level) that can offer the basis for the integration of ICT in schools.

2. To analyze relevant resources for ICT integration in schools - either within or outside the educational system (model, best practices, training programs, mentoring and support mechanisms, supervision, incentives, competitions.

3. To clarify some issues related to ICT integration in schools:

a. to identify national standards in this area (at curricular, managerial level, teacher training, resources);

b. to e valuate the relevance and coherence of current national quality assurance mechanisms in this field;

4. To identify, through secondary data analysis, pupils' expectations regarding the integration of ICT in the educational process.

5. To assess teachers' abilities and attitudes regarding the integration of ICT in schools.

2. Opportunities and constraints at national level regarding the ICT-based education

2.1 A functional analysis of the current legal framework

Here are the conclusions of the analysis undertaken, supported by the results of other reports (e.g. the national report DECODE IO2 "*Innovative Training Models, Methods and Tools for Teachers in the Digital Age*") regarding the relevance of the current legislative framework. A number of aspects, consistent with the development of educational policies in European countries, were found in the fundamental national educational policy documents:

- The National Law of Education. Among the most important provisions included for this area are:
    - Specific provisions on the development of digital competences in compulsory education. The national curriculum for primary and secondary education focuses on 8 key competencies that determine the student's training profile, one of which is digital competence;
    - Establishment of the Virtual School Library and of the School eLearning Platform, which include school curricula, examples of lessons for all subjects in school curriculum, methodological guides, examples of evaluation tests. They are used by educational establishments to assist students during or outside school hours or for those who, for health reasons, cannot attend school temporarily;
    - Integration of a digital competence assessment (D) test within the National Baccalaureate Exam:
- National Strategy for Romania 2020 Digital Agenda
    - It defines the institutional framework to ensure a unified approach, by centrally managing all aspects of the digitization of public services, including education, in order to ensure their compatibility at European level. Education is included in area no. 2 "ICT in Education, Health, Culture" in order to support these technologies at sectoral level. Among the targeted measures: enhancing digital content and developing ICT infrastructures in the fields of education, health and culture and supporting the increase in added value generated by the ICT sector by supporting research and development and innovation in the field.
- Framework plan for lower secondary education (OMENCS 3590/5.04.2016)
    - The graduate's profile of competences (preschool, 4th grade, 8th grade, 10th grade, 12th grade) includes digital competence as one of the 8 key European competences for lifelong learning;
    - In line with the international trends, the mandatory Informatics and ICT curriculum for 5th-8th grades has been introduced, which has allotted 1h/week. It provides training on basic computer use and algorithmic programming.

In regard to the consistency of these measures, however, there are many dysfunctions. Many of the provisions of the Law of National Education (2011) are not yet accompanied by specific implementation methodologies (e.g. the development of the Virtual School Library and the eLearning School Platform).

2.2 An assessment of the available resources at national level

Currently, one of the issues raised by the implementation of new technologies in education concerns the lack of an overview of the stage and situation of implementation. In this sense, in the future, it would be necessary to centralize data collection, to have a nationwide and systemic inventory of the current situation, regarding the way in which policies are implemented, the material and educational infrastructure, the external network of education providers/educational resources (NGOs, private initiatives, etc.), training network, beneficiaries - teachers who have received training and those who have not benefited, practices and methods of implementation in schools, identifying deficiencies - what works and what did not work, the applicability of projects implemented so far, collecting suggestions for improvement.

In the absence of a national evaluation of resources for ICT integration in the educational process, although extremely valuable expertise and experience-based opinions of interviewees, we can only talk about estimates of the situation with a limited degree of generalization. From the opinions of the experts interviewed, we can derive the following points:

TRAINING

- Numerous teacher training courses have been organized in recent years for the acquisition of digital competences and methodology for ICT integration in schools. However, they are not considered sufficient for all teachers to have the appropriate training in a growing field.

- In terms of initial training, the teacher training curriculum includes a compulsory course called „Computer Assisted Training" as part of the pedagogical module of the third year of study.

SUPPORT MECHANISMS

- Mentoring in this field is carried out rather informally, within communities of practice. More and more teachers join online international teachers' groups. Strong communities have developed around both the Microsoft Educator group and the Google Educators group - these two groups being the most relevant, as each offers online (and certified) training programmes for "digital teachers".

- Teacher supervision is assimilated to the classroom inspection, which implies, besides the coercive and unfriendly connotation, a lack of continuity and rhythm, as well as the difficulty of covering the entire territory of the counties.

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TEACHING RESOURCES

- In terms of teaching resources, good practices and ICT integration models, the need for a national platform to integrate what already exists, with reference to other existing programs / platforms, and ensuring access for all teachers and pupils has also been highlighted.

- The experts' opinion is that, although the teaching resources available are diverse and their applicability is wide, there are still few good practices and models on the integration of ICT in educational-instructive work.

- In order to identify other examples of good practice, the Ministry of Education recently asked the School Inspectorates to create a section called „Good Practices in Education" on each inspectorate's website, where all these examples from each county should be published.

MATERIAL RESOURCES

- The problem of insufficient infrastructure is invariably evoked as the main factor to explain the stagnation in the implementation of the "*digital revolution*" in schools. Improving the situation should begin with buying equipments for schools, acquiring adequate material resources (tablets, laptops, video projectors, digital boards - for the classrooms), educational software, as well as ensuring the functionality of computer laboratories. Currently, because of a lack of funds in schools, there is insufficient material resources to ensure that digital literacy is exercised and put into practice at all times in any school.

Without entering into the details of the huge discrepancies between the urban and the rural schools, one needs to recognize that in most schools there are limitations and compromise situations such as: teachers expect take turns in using the video-projector for use in the classroom, IT labs of high schools where there are math-computer classes are overcrowded, and due to overlapping hours some classes cannot use the lab for all computer-classes, the internet network fails, the multimedia rooms are not functional, the equipment needs permanent improvements.

A concrete case from an expert, professor and computer inspector highlights the shortcomings in a high-level high-school: "*We have 3 computer labs and 4-5 video projectors for teachers to use, but there are about 40 classes. At best, 8 classes use the equipments and 32 classes do not use it at school."* The expert continues with a general observation: "*As an inspector, I can say this phenomenon applies to all schools, but in well-established high schools the equipments are of better quality, while in the rural areas these issues are more acute not only because of the technical infrastructure, but also because of the lack of qualified teaching and maintenance staff. As I said, due to the lack of a large number of equipment, the digital component is largely absent in schools.*"

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- The Ministry of Education has implemented in 2001-2009, 5 stages of the SEI (IT-Based Education System) project and succeeded in endowing high schools and most gymnasium schools with technical equipment. However, this equipment is currently technologically outdated or affected by material wear.

- Through the Competitiveness Operational Program 2014-2020 the Ministry of Education wants to implement, through ARNIEC, the "Wi-Fi Campus" project that aims to bring wireless Internet to every classroom.

- Overall, in terms of resources and infrastructure, improvement measures are required, the good news being that solutions exist - both locally and nationally.

RECOGNITION, INCENTIVES, COMPETION

- Formally, attending certified training courses is rewarded with professional credits for teachers. Also, training for the improvement of digital competencies is marked separately in the annual evaluation sheets, as there is this criterion in the teacher evaluation sheets, respectively in the evaluations for the awarding of merit grades. Still, it is important how the evaluation is carried out, how rigorous it is and what is considered as use of ICT, as one of the interviewees said: "*If the students just watched a movie without a worksheet ... They could have just a happenstance discussion right then, but this does not mean that I would be happy with the way in which the technology was used. If the student has a very clear worksheet, through which he has been told to focus on certain things, and if, afterwards, he then works some more based on additional information, if that discussion is well prepared beforehand and he sees that there was a clear thread there, then I'm really pleased to have used the technology. I cannot be satisfied with just seeing a video-projector, a laptop and having taught a lesson using photos.*"

- Another point of view emphasizes the competitiveness and professionalism resulting from the use of modern technology in teaching, as the most important stimulating factor - "*Imagine how a digital teacher can deliver an attractive course to the digital natives; imagine a teacher who understands the learning needs of digital natives.*" In this sense, the integration of new technologies should be considered as something natural, and recognition and reward should be granted more for pedagogical mastery and for attaining educational purposes, and less for the mere use of ICT.

- On the other hand, the financial reward is considered as a necessary incentive for those who coordinate international projects on this topic, by allocating a share of the project's financial resources. This proposal comes from a teacher who has been involved in the Comenius and Leonardo da Vinci projects on this issue. He thought that these projects are "*very hard to coordinate and nobody is thinking that it could be useful to offer some sort recognition for the work that it involves.*"

- When it comes to local-level institutions, in particular, county school inspectorates, there is no policy that would aim to incentivize and increase the competitiveness of ICT integration.

- As a general note, the experts and key interviewees tend to think that recognition, although there is appreciation for the use of ICT by teachers, is limited.

INVESTIGATING THE NEEDS OF THE BENEFICIARIES AND ADDRESSING THEM

- "*Beneficiaries' needs for ICT equipment, training and support for their use are generally known and acknowledged but are poorly researched at both national and school levels. Even the justification of teacher training projects is not based on a real analysis of needs*", one of the experts told us. The last evaluation regarding the implementation of new technologies, with an emphasis on the SEI programme, which included a series of recommendations on the pedagogical aspects of ICT integration, was carried out in 2008 by an ISE team in partnership with the University of Bucharest and NGOs.

2.3 An analysis of the organisational structure of actors at all levels

The integration of ICT in school depends to a large extent on the digital infrastructure provided through school funding mechanisms. The institutions involved in making financial decisions to allocate funds to schools are: the Ministry of Finance, the Ministry of Education, local authorities, the Treasury (at county and local level), and the school themselves.

School financing
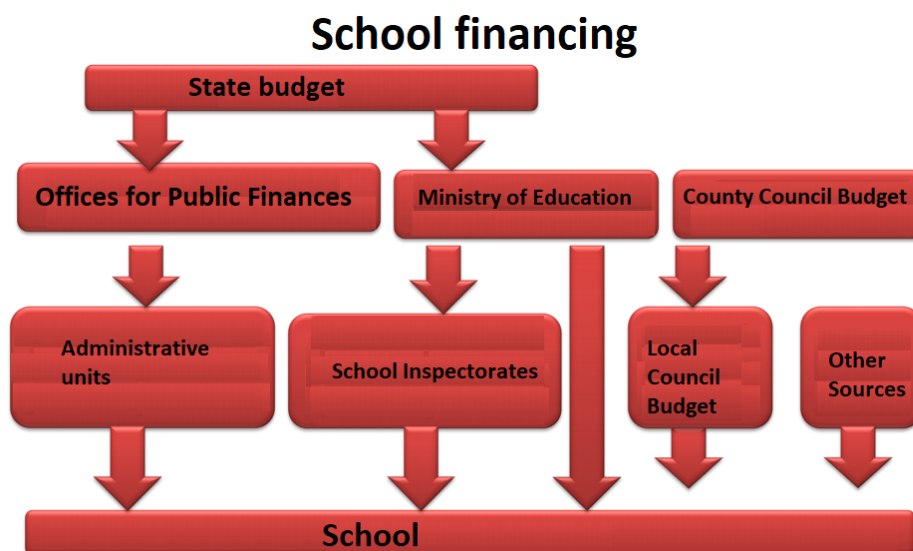
Adapted from: Leahu, Măntăluță & Herțeliu,
Analiza privind finanțarea învățământului preuniversitar de stat, Craiova, 2014.

The parties involved in the decision to spend in a certain way the amounts of money received from the national budget are the local authorities, the school management, and the county school-inspectorate. The decision can be limited by the need to consider the educational objectives and to provide a coherent delivery of the curriculum and is dependent on the legal provisions and the organizational culture. In a decentralized framework and within a partnership structure, local councils and school principals substantiate, elaborate and control the needed budgets.

One of the problems that were identified is that the legislation does not allow the director to exercise its powers to administer the allocated funds according to the school's priorities. Decentralization is therefore regarded as a meaningless provision. Other issues include the lack of involvement of the representative of the local council or the mayor, the fact that schools do not have directors who would also be good managers and are not prepared for financial autonomy.

The basic funding approved annually through the state budget law is distributed to villages, towns and municipalities by the general directorates of the county public finances, with the specialized technical assistance of the county school inspectorates. Local or county councils can contribute from their own budgets to the basic funding, which include expenses for training, materials and service-provision. Complementary funding comes from the county or the local council, as well as from the state budget. Basic and complementary funding is based on the management contract concluded between the head of the educational unit and the mayor of the locality. Schools can also benefit from additional funding from the budget of the Ministry of Education, or from the County and Local Councils in the form of grants or prizes for their achievements. Schools can also have their own income from donations, sponsorships, on-demand courses, participation in external funding programmes, rentals, publications, extra-school activities etc.

The actors involved in the budgetary planning process are, in the order of their decision-making power: the accountant of the school or of the budget execution centre, the deputy director, the members of the management team, the representative of the municipality / local council in the Administrative Council, another representative from the community, specialists from the local administration institutions, the parents' representatives in the Administrative Council, and teachers.

An analysis published in 2014[1] shows that: over two-thirds of schools face inadequate incomes for employee training; about 40% of schools have insufficient funds for goods, services, maintenance and repairs; one in three schools has difficulties in covering utility bills; alongside capital spending and teacher development, local authorities are only able to provide very little resources for extra-curricular activities; the state of goods on the school inventory is bad, requiring funding that the local council cannot afford; except for situations where the computer base is obsolete and requires

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[1] Leahu, Măntăluță & Herțeliu, *Analiza privind finanțarea învățământului preuniversitar de stat*, Craiova, 2014.

investment, access to equipment (fax, copier, computer) has led to a significant increase in the cost of consumables and maintenance.

Besides the financial constraints faced by schools, ICT integration also depends on a systemic vision of the implementation process, where different actors have a more or less clearly defined role.

CENTRAL MANAGEMENT AUTHORITY – Ministry of Education

The Ministry has responsibilities related to the creation of tools and quality assurance mechanisms (planning and control), coordination of the implementation of the Strategy and of the Programme of Governance in the field of education, vocational training and academic research, the realization of the education policy in the field of education.

- According to the National Education Law no. 1/2011, the national pre-university curriculum aims at developing key competences, including digital competences.

- The Education Plan defines the training profile of graduates of compulsory education as explicitly aiming to develop digital skills.

- The National Strategy for the Digital Agenda of Romania 2020 includes as a priority action area the integration of ICT in education.

There is currently no specific regulation to assess and ensure the quality of ICT integration in education.

Among the various measures taken by the Ministry of Education, we mention the implementation of the SIIIIR Educational Management Information System, which is a data collection, processing analysis, and decision-support tool. Together with the other national administrative IT systems, they form a set of tools with which decision-makers at any level can base specific policies and actions in education. Another important programme was launched by the Ministry of Education in 2001 - the national programme "Digital Education", which included a teacher training programme, providing equipment for schools, and an educational programme (e.g. the Advanced e-learning platform – AEL).

SCHOOL INSPECTORATES

According to the Framework Regulations on the organization and functioning of school inspectorates, among their attributions is the application of policies and strategies of the Ministry of Education at county level, the monitoring of the application of legislation, the monitoring of the quality of the teaching-learning activities and the compliance with the national standards / performance indicators, through school inspections. They also control, monitor and evaluate the quality of school management; monitor the implementation of the national programmes initiated

by the Ministry of Education in the respective county, as well as that of projects carried out by schools, including those realised in the frame of European Union programmes in the field of education and youth.

LOCAL COUNCILS

There are programmes whereby Local Councils (responsible, according to the law, for the infrastructure of schools in their community, as the Ministry of Education only provides educational policies and the human resources) can modernize the material base of schools through different national programs or European projects.

SCHOOL MANAGERS

Experts with whom we talked are of the opinion that so far there has been a vague interest of institutional managers for the use of ICT. Usually is restricted to teachers who have a special interest in this area. There is a need to integrate a particular objective or action related to ICT within the Institutional Development Plans or the Directors' Activity Plans. It is important for a school to have a clear direction regarding ICT integration, considering that the teacher's assessment sheet details the use of technology in the classroom, and that each teacher knows that he/she is also evaluated from this point of view. Instances of school managers shutting down computer labs so that they „*they are not damaged*" have been unfortunately mentioned.

SPECIALISED TECHNICAL PERSONEL

In many schools there are no system engineers, thus the maintenance of computer and internet networks is supplemented by computer science teachers or other teachers. The data of the 2008[2] evaluation, part of the SEI programme, shows that the administration of computer equipment in schools - computers, internet networks, the installation of applications – is done by one of the teachers (in 60% of the schools), an employed System Administrator (30% of cases), a specialized business provider (9% of schools), and even by students (1% of schools).

TEACHER TRAINING CENTRES

Teacher Training Centres are resource centres aiming at the professional and personal development of the employees of the pre-university education system in Romania. There are courses at the TTC proposed by IT teachers, and not only.

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[2] Eugen Noveanu et al., *Informatizarea sistemului de învățământ. Programul S.E.I. Raport de cercetare evaluativă* București, Editura Agata, 2008.

Each teacher's obligation is to collect 90 credits from training courses during a five-year period, but they are free to choose the course of their liking, and there is no obligation to follow a training about the use of ICT in teaching, consolidation of learning and evaluation.

DEPARTMENTS FOR TRAINING OF TEACHING PERSONNEL

There are departments with a psycho-pedagogical profile in universities. They provide and manage professional skills development programmes for students and graduates of higher education institutions, and for the teaching staff in pre-university and higher education. The competency certification programme for the teaching profession aims at developing the professional psycho-pedagogical, didactic, digital, managerial and research competencies necessary for the exercise of didactic functions in education.

TEACHERS

At the end of the chain of responsibilities are the teachers, in their hands finally being the key to the didactic success, which of course depends on the material endowment (at school and at home), human endowment (pupils, teachers, managers), but especially on interest for the ICT study, the teacher's training and passion to find the best methods, and his professional experience.

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3. Integrating ICT in the Curriculum

The table below summarizes the end of cycle ICT competences which pupils are expected to acquire, according to the *Graduate's profile (*ISE, 2014*)*:

I.3.g. Digital competences according the Graduate's profile		
Digital competences	Pre-primary education	- Learning to use simple functions and applications of digital devices from his/her environment, with adult support. - Developing simple digital content in the context of learning activities. - Compliance with basic safety standards for the use of devices, applications, digital content and the Internet.
	8th grade	- Using digital devices and applications to search for and select digital educational and informational resources, relevant for learning. - Developing multi-media digital content in the context of learning activities. - Compliance with the standards and rules of development and use of virtual content (intellectual property rights, respect for privacy, online safety).
	10th grade	- Critical, selective and creative use of complex information and educational digital resources and applications as support in the daily routine of learning. - Constructive and creative participation in the development of digital content, including social media or open educational resources in the context of educational projects. - Promoting online safety rules and positive and constructive behaviours in virtual social environments.
	12th grade	- Building a personal environment of digital resource and digital applications relevant to learning needs and interests. - Constructive and creative participation in virtual learning communities, relevant to future personal or professional needs and interests.

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		- Critical and reflective assessment of the impact of information and communication technologies on their own learning, individual life and social relationships in general.

4. How ICT is integrated in educational practices

Teachers' access to required skills for the use of new technologies in teaching and learning process was the subject of several initiatives mapped during the data collection phase. The initiatives have targeted teachers' capacity to use a multitude of ICT programs and tools. Projects have often been implemented in transnational partnerships.

One example is the project "Developing the digital competences of primary school teachers for working on the collaborative platforms of the future" implemented by "Vasile Lupu" Pedagogical High School in Iasi within the Eramus+ program (Key Action 1) and aimed at improving teachers' digital skills through internships at a Spanish school.[3]

Another similar Erasmus + Project, "High School High Tech – School of the Future", by "Edmond Nicolau" Technical College, aimed at the acquiring of digital skills and the teaching staff capacity in implementing modern teaching methods and strategies through tablets use. The training course was developed by a Finnish organization.

Over time, virtual communities of teachers of different disciplines have appeared, with a more or less formal organization that creates and distributes resources relevant to their work. There are a lot of discussion and sharing groups like Facebook, or sites created by teachers or private firms.

4.1. Learning authentic communication through ICT (language and literature)

The information gathered through interviews and other sources has revealed that the use of new technologies to support the acquisition of communication skills is based, in particular, on small-scale local initiatives.

In teaching literature, an example is the ePortfolio method[4], which translates the idea of the classical portfolio in the electronic environment and represents a complementary method of assessing pupils' personal achievements and progress. An ePortfolio can be a web page, a weblog or wiki, or an integrated application. This method has been extensively presented and harnessed by two teachers who have developed a blog called "Techniques of writing (non)literature using ICT" and used as the web2.0 tool for an optional interdisciplinary course on Romanian Language and Literature and ICT.

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[3] http://scoalanormala-vasilelupu.ro/index.php?page=proiecte
[4] http://roinfocds.blogspot.ro/2008/01/eportofolio.html

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4.2 Formulating and solving problems in the digital age (maths)

Mathematics has benefited from far more wide-ranging initiatives to promote the use of ICT in the classroom. "Opportunities for a High-Quality Didactic Career through a National Program of Continuous Education of Mathematics Teachers in Pre-University Education"[5] was a project implemented through a national partnership between Ministry of Education, University of Bucharest, Teaching Staff Houses, Romanian Society of Mathematical Sciences and a private software company. The project aimed at creating digital resources for teaching mathematics at secondary level and training 4,000 teachers in the use of these resources.

A similar initiative, both in purpose and scope, was coordinated by the Iasi County School Inspectorate, together with the Ministry of Education, and was called the "Continuous Training of Mathematics Teachers in the Society of Knowledge"[6]. The goal was to empower mathematics teachers to implement curricular activities through ICT resources. More than 5,000 teachers were trained through the online project platform.

As an example of direct work with students, "Centre for training gymnasium students capable of high performance in mathematics and computer science"[7] organized by the Vrancea School Inspectorate, aims at developing students' mathematical and computer skills. Each year, approximately 200 pupils participate in the programs offered by the Centre. Since 2008, Vrancea School Inspectorate has also promoted the implementation of an Optional Informatics Program for Gymnasium[8], encouraging schools to include it in their educational offer.

4.3 Virtual Labs (sciences and technology)

The eTwinning program has facilitated cooperation on science and technology between teachers and student classes in many transnational collaborative projects. "Open the gates to the Universe"[9] was such an initiative that brought together the efforts of participants from five countries (Romania, Cyprus, Portugal, Poland and the Republic of Moldova) to encourage primary school pupils to explore concepts related to astronomy through joint activities with colleagues from other countries. Nine-year-old groups of the five schools involved have worked together on tasks regarding astronomy, ending in an electronic journal that documented the process they have gone through.

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[5] www.matedidactica.ro; http://portal.matedidactica.ro/
[6] http://matematica.isjiasi.ro
[7] https://excelentamateinfo.wordpress.com/
[8] http://isjvn.vn.edu.ro/utile/informatica.php
[9] http://isjvn.vn.edu.ro/utile/informatica.php

"Edmond Nicolau" Technical College (Focşani) has created a "Centre for Excellence in Educational Robotics"[10] to promote the teaching and learning of ICT, technology, mathematics and engineering elements.

A Romanian private company has developed a virtual lab called "Advanced eLearning" (AEL)[11] that provided learning resources in a virtual environment for a multitude of national curriculum' areas. AEL laboratories were introduced in all schools in Romania, and teachers were trained in using this educational software.

4.4. Scientific exploration through virtual environments (history, geography)

One of the most interesting initiatives for the use of new technologies in the scientific exploration process belongs to "Emil Racoviţă" National College in Iaşi that has implemented a program for the development of educational software by students on a variety of topics, under the guidance and coordination of teachers.[12] Thus, on the College's website there are students' software on subjects from grammar and literature to general culture, history or mathematics, computer science and logic. Work within the program is not only a cross-learning experience for students and an acquirement of different ICT skills, but it also has an impact as a useful resource for documenting. Some of the software has received awarded in various local or national competitions.

4.5. Creative minds - creative applications (arts)

The using of new technologies in exploring arts was poorly represented among the initiatives we identified in the education system. Instead, there are museums that sought to make their patrimony accessible for educational activities through apps.

The National Art Museum of Romania (MNAR) has launched the "ARTmobile application" that can be downloaded for free on mobile phones and tablets. The app is designed to accompany a museum visit or be accessed as an audio book.[13] There are 40 works, of which 15 are accompanied by dramatizations that introduce into the atmosphere of the era in which the works were created, and 17 are accompanied by short subtitled films. MNAR's Brueghel application[14] also has an educational scenario behind it.

People with visual impairments have access to tactile diagrams available for free. During the school year 2017-2018, tactile diagrams and audio descriptions will be available for 11 other diagrams, in addition to those already published regarding paintings by Corneliu Baba, Nicolae Tonitza and Paul Signac. Two other applications are also available for visually impaired people.[15]

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[10] https://roboticaexcelentavrancea.wordpress.com/

[11] http://www.advancedelearning.com

[12] http://racovita.ro/index.php?option=com_content&view=article&id=377:software-educaional&catid=179:info&Itemid=159

[13] www.mnar.arts.ro/exploreaza/193-multimedia#descrieri-audio

[14] https://play.google.com/store/apps/details?id=com.pixelpunch.mnar

[15] https://play.google.com/store/apps/details?id=ro.upb.ing.guercino; https://play.google.com/store/apps/details?id=ro.upb.ing.signac

4.6. Providing support for harmonious development (counselling and guidance)

In the early 2000s, an international consortium developed a useful resource in career counselling, called the Occupational Guide[16]. It is designed to offer clients a range of procedures regarding the choosing of an occupation based on different selection criteria, including the possibility to select related occupations and provide concise and pertinent information about each occupation. Whether individually or with the help of a career counsellor, users can explore the work activities of different occupations, find information about writing a CV or participation in an interview, or find out more about starting a business on their own.

Career4u[17] is a career counselling tool for the Romanian counselling system, developed during 2013-2015 as part of a Leonardo da Vinci project. It aimed at adapting the description of 280 occupational profiles to the Romanian context[18]and their association with instruments capable of guiding professional choices. The project was based on tools developed by a subsidiary of the University of Loughborough (UK) and its implementation in Romania was coordinated by Danubius University in Galați.

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[16]http://go.ise.ro/
[17]http://career4u.ro/; https://www.facebook.com/Career4u.ro/
[18]http://www.euroguidance.ise.ro/uploads/6/1/7/7/6177451/kelly_career4u.pdf

5. Examples of using relevant digital devices and resources

The last two decades have brought a multitude of ICT practices into the Romanian education system, both through national initiatives and through transnational cooperation. There is no consensus among the interviewed experts on the extent to which these practices and tools respond to the current needs of the education system, but the most important factor influencing the efficiency and effectiveness of ICT use seems to be teacher training.

The use of digital resources and devices can be analyzed from the perspective of the tools that are being used, the programs that develop tools and the communities that promote them.

5.1 Instruments

The most widespread ICT tools in the education system are those that facilitate the management of the educational process, both from the point of view of the teaching staff and of the educational units' management. We refer here to means of creating, processing, storing and distributing information.

Desktop computers and, to a lesser extent, mobile devices have been an everyday reality for many years in all schools. Information processing is most often done with programs such as OpenOffice or Microsoft Office. The most common ways of communication are emails or discussion groups (Yahoo, Google, Facebook, Whatsapp).

More recent technologies, such as 3D printers or virtual reality devices, are still scarce, except for some schools that have implemented pilot programs.

Educational software is widespread, and there have been national programs that have pursued teacher training in this respect, but their adoption in teaching practice is unevenly distributed within the system. An idea highlighted by participants in focus groups was that teachers' age is not a determining factor in the adoption of new technologies. Because most educational software is available in other languages, foreign language teachers have more resources to harness for learning.

An example of integration of new technologies in the teaching process is the "Mihai Eminescu" National College in Satu Mare, where teachers have access to multi-touch tablets[19] and specific software applications to stimulate collaborative work in the classroom.

5.2 Programmes

A number of public, private or public-private partnership initiatives have led to the diffusion of ICT tools in the education system. Public initiatives were mainly directed towards ensuring the best

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[19]https://sites.google.com/site/echipamultitouch/

access to material and educational resources, while private initiatives had a strong innovation component.

In 2014, a memorandum was signed between the Ministry of Education and Google that provides the free use of Chromebooks and Google Apps for Education in any school in Romania. At national level, a number of promoters have been trained to facilitate the training of those interested to include these applications in their practice.

Another initiative from a multinational corporation involved the creation of laboratories called Smart Classroom[20] that allow the creation and deployment of educational scenarios with a strong collaborative component.

The Orange Foundation[21] supported the efforts of several dozen schools, with a special emphasis on rural ones, for the integration of interactive working methods based on technologies into the teaching process.

NGO initiatives have targeted issues such as promotion of the ICT use in the primary education level (e.g. Digital Guide[22]) or acquiring programming skills (e.g. Code Kids[23]).

All these programs have helped diversify and increase access to ICT resources and tools.

5.3 Communities

ICT tools have found a very important application within communities of practice. Each of these communities tends to specialize on a particular theme or a way of interaction. Among the most important communities at national level, we mention iTeach[24] and ISE Learning Platform[25] (specialized in teacher training) and Didactic[26] (specialized in the distribution of educational resources). Other communities have developed around curricular areas[27] or cross-cutting themes.[28]

The general impression is that the educational system in Romania has passed the phase in which technologies were the benefit of a small number of teachers, but the generalization of their use has not yet reached a critical mass. The contribution of interaction and peer pressure to the spread of new technologies in teaching practice is essential.

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[20]http://smart-classroom.ro/

[21]http://www.fundatiaorange.ro/proiecte/educatie-digitala/index.html; http://www.digitaliada.ro/

[22]https://indreptardigital.ro/

[23]http://www.progressfoundation.ro/coding/

[24]https://iteach.ro/

[25]http://training.ise.ro/

[26]https://www.didactic.ro/

[27]https://www.facebook.com/groups/1513752182187109/; https://www.pbinfo.ro/

[28]www.culturaineducatie.ro

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6. Teacher training for the integration of ICT in the educational process

The methodical skills needed to integrate ICT into lessons can be developed through teacher training courses, but there is also a significant informal component to the acquisition of this type of skills, which should not be overlooked.

In terms of initial training, the teacher training curriculum includes a compulsory course called „Computer Assisted Training" as part of the pedagogical module of the third year of study. This course should develop, in addition to the needed technical skills to use the computer for training purposes, those abilities related to the use of pedagogical methods that integrate technology into teaching, learning and evaluation. For this purpose, practical applications of the use of digital technologies in the teaching of any discipline should be included in the course format. Another proposal aims at setting up a didactic MA degree, with the recommendation that relevant training expressly seeks the successful use of new technologies in the classroom activity, regardless of the given teaching-discipline.

National education policies support the development of pedagogical and methodological innovation through ICT through programs such as *Teacher Training in the Knowledge Society: DeCeE*; *The Internet in your school* - that is a national project, or the *INSAM* (*Digital Improvement Quality Assessment in Pre-University Education*) that aimed at developing and implementing digital tools and mechanisms. The Ministry of Education is currently implementing the CRED Project (*Relevant curriculum and education open to all*), designed to create Open Educational Resources, as well as the continuous training for teachers to use these resources in the classroom.

Other courses are available as continuous training: ECDL courses and exams for all teachers (regardless of their specialization), the training *ICT Key competence in the School Curriculum*, the training C# for IT teachers, the INSAM training, and platforms for IT and ICT, continuous training programmes for teachers on the use of new technologies in the classroom, a support programme for teachers who started teaching Computer Science and ICT for the 5th grade etc.

The IntelTeach Program debuted in Romania January 2007. The idea was that teachers must not assimilate information passively but learn to work effectively during an intensive training course in which they alternate "face to face" training with practical themes and individual applications. They had the opportunity to accumulate a different learning experience that they can then use in the classroom, in which the teachers have built the lesson project. An impact study analysing the results of the IntelTeach Program - Learning in the Knowledge Society in Romania has revealed that 82.8% of teachers who have followed this program now use ICT in a manner that involves modern pedagogical resources that they integrate in a creative and innovative way in their own teaching.

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An ample ESF funded project[29] run by the Iași County School Inspectorate, in partnership with Tulcea County School Inspectorate, Iași Teacher Training Centre and SIVECO Romania, which finished in 2013, has offered two series of training courses. Teachers were able to attend training courses such as "*ICT for Primary School Teachers*" and database management.

International programs facilitating the exchange of experience for teachers are considered very important for acquiring the necessary skills and represent a way to import good practices in the field of ICT integration. Difficult access to ERASMUS projects

[29] http://isjtl.edu.ro/proiecte.htm

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7. Quality assurance and evaluation tools and procedures at national level

New technologies have been taken into account since the first standards were developed in 2005, which were approved in 2007. These were recently systematized and reduced: for accreditation, instead of 611 descriptors there are currently 133, while for reference standards the number of descriptors decreased from 450 to 403. At the same time, a reconfiguration resulted in a system of 43 indicators. In 2017, the Romanian Agency for Quality Assurance in Pre-university Education (ARACIP) launched a public debate on these updated evaluation standards for authorization, accreditation and periodic evaluation.

ARACIP has also created a platform[30] through which schools manage the quality assurance component. The platform aims to become a virtual community. Taking advantage of the opportunity offered by ESF projects, ARACIP assumed a training function for school managers and quality assurance officials by means of trainings, manuals, guides, round tables, conferences. Furthermore, a body of *trainer counsellor* has been professionalized and can be found by means of a registry. They can be accessed by schools in for services pertaining to quality assurance consulting.

The new standards explicitly refer to "*Availability of ICT technology*". At the time when the school receives its authorization, these standards are formulated in terms of the projection (e.g. "*does it have an allocated budget*") while at the time of accreditation, they ar formulated in terms of availability and functionality. Here is an extract from the accreditation standards which reference ICT:

4.3.1. The existence of information and communication technology (a functional network of at least 6 computers) - except pre-school level.
4.3.2. Internet connection for the computer network.
4.3.3. Expanding the use of information and communication technology to other subjects in the national curriculum and/ or at the decision of the school's, other than those corresponding to the "Technologies" curricular area.
4.3.4. Numerical growth of disciplines using information and communication technologies as well as, within the discipline, the number of hours in which information and communication technologies are used.

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4.3.5. Ensuring access for all students and teachers to the computer network, for documentation and information during and outside of dedicated course in the school curriculum.
4.3.6. Ensuring a sufficient number of computers, so that the number of pupils/computer in that school is at most equal to the number of students/computer corresponding to the county/Municipality of Bucharest where it is located and level of education offered.
4.3.7. Use of information and communication technology in administrative and / or secretarial and / or library work.
4.3.8. Providing / improving / updating / periodic replacement of the equipment and software used.

For each category of standards, mandatory minimum requirements (authorization and accreditation) and requirements leading to an optimal level (reference) are specified. Optimization of the use of the material resources is a process that goes hand in hand with the teaching-learning process. This continuous need of updating was internalized by ARACIP and it can be found in the objective of the Strategy of Modernization of the Educational Infrastructure 2017-2023 ("*ensuring and developing quality learning environments that support the learning process*"). The way in which ICT tools are integrated into educational practice is made explicit through indicators no. 19 and no. 20. This is treated together with the ICT component for libraries.

Domain: A. Institutional capacity
Criterion: b) Material basis and optimization of the use of the material base
Indicator 19. Equipment with information and communication technology

Standards for authorization for provisional operation	Standards for accreditation	Reference standards
19.A.1. The existence of an ICT/IT lab, equipped with at least one functional network made of an adequate number of computers or other types of terminals (tablets, etc.) connected to the Internet (not exceeding 2 pupils /	19.A.1. The existence of an ICT/IT lab, equipped with at least one functional network made of an adequate number of computers or other types of terminals (tablets, etc.) connected to the Internet (not exceeding 2 pupils /	19.B.1. To what extent the IT equipment, software and applications are up to date (not morally /technically outdated). 19.B.2. The existence of progress since the last periodical evaluation in regard to of the acquisition/ renewal of IT equipment,

computer or other terminal, for classes). 19.A.2. Existence of applications, software and curriculum auxiliaries for all curricular areas. 19.A.3. The existence of a sufficient number of multimedia equipment (laptop / desktop + video projector + speakers) so that each class of pupils can use it at least one hour each day of school. 19.A.4. The existence of at least one scanner, a high-capacity printer and a copier for each level of education for use during the teaching process.	computer or other terminal, for classes). 19.A.2. Existence of applications, software and curriculum auxiliaries for all curricular areas. 19.A.3. The existence of a sufficient number of multimedia equipment (laptop / desktop + video projector + speakers) so that each class of pupils can use it at least one hour each day of school. 19.A.4. The existence of at least one scanner, a high-capacity printer and a copier for each level of education for use during the teaching process.	software and applications, according to the needs of the school community (beneficiaries, teaching staff and administrative staff) and the previously established development targets. 19.B.3. Existence of partnership agreements (with public institutions, companies or NGOs) or the acquisition of complementary educational services in order to expand and improve the use of information and communication technologies in the educational process. 19.B.4. The possibility of accessing, within a secured network, the documents and the computer applications necessary for the educational process. 19.B.5. Availability of information and communication technology in relation to the strategic targets set in the school development plan. 19.B.6. Additional equipment, from a qualitative point of view of (compared to to

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		accreditation standards), with information and communication technology (e.g. video / photo cameras, smart boards, large touch screens, simulators, etc.). 19.B.7. Ensuring access for beneficiaries of the educational process (i.e. students) to computer equipment, software and applications outside of regular classes (i.e. for organizing extracurricular activities).

Domain: A. Institutional capacity
Criterion: b) Material basis and optimization of the use of the material base
Indicator 20. Accessibility of equipment, materials, educational means and curricular aids

Standards for authorization for provisional operation	Standards for accreditation	Reference standards
None	20.A.1. Ensuring access for students and teachers, including those with disabilities, to educational resources, auxiliary curricular materials, the library / documentation and information centre, information and	20.B.1. Using the existing documentation materials for curricular and extra-curricular activities by at least 75% of pupils and by all teachers. 20.B.2. Ensuring that pre-school children / students have direct access to the existing documentation materials by distributing part of it within the school and auxiliary spaces - either in physical or electronic form, through computers equipment which will be at pupils' disposal. 20.B.3 Existence and use of equipment (including ICT), materials, teaching aids and auxiliary curricular materials, specific to special

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	communication technology.	educational needs/ disabilities identified at the level of pupils and staff. 20.B.4. Involvement of teaching staff and pupils in the design/ adaptation of equipment, materials, educational and auxiliary curricular materials, necessary in the teaching process (including those for pupils with special educational needs/ disabilities). 20.B.5. Training of teaching staff and administrative staff for the use and management of the existing documents and of information and communication technology.

ARACIP's experience of direct work with schools for over 10 years has led to the development of standards that are better anchored in school reality. This practice revealed that "warm resources" (i.e. teachers), are more important than "cold resources" (i.e. equipment), especially in rural areas. Discrepancies between rural and urban education regarding the presence of new technologies are underlined by the State of Educational System Report (ISE, 2016): "*the Romanian education system is characterized by significant differences in terms of access and quality*."

ARACIP evaluators report both about positive situations, where the equipment is exceptional and is accompanied by the formulation of descriptors adapted for that school (application of reference standards) and about negative ones, in which a school might not even have some types of authorizations (e.g. health authorization).

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8. Recommendations for an efficient integration of ICT

The purpose of this report is mainly to inform the DECODE Partnership on the state of the integration of ICT within the Romanian formal education system.

During the course of our investigation we have come across a series of recurring issues which would warrant targeted interventions in order to improve the effectiveness of the use of ICT in the teaching-learning process.

- While quality standards reference the updating of ICT equipment, we have found no provisions regarding a mechanism that would ensure that this happens on a regular basis. Financing mechanisms have so far been largely connected to large infrastructure projects and schools have few resources keep up with the development of ICT. It would be highly desirable to establish a national level mechanism that would make it possible for schools to constantly update ICT equipment. This would go a long way in bridging the gaps that have developed between schools due to local economic factors.

- The initial training of teachers still does not match the expectations set by the National Law of Education (2011), which mandated the creation of master's level training programmes for BA graduates intent on pursuing a teaching career. Courses offered as part of initial teacher training are predominantly focused on technical aspects of the use of ICT, rather than pedagogical aspects. This issue can be addressed by closer cooperation between Universities and the Ministry of Education when new teacher training programmes will be developed.

- ICT related curricula tend to focus on technical aspects and programming, rather than the acquisition of ICT skills for daily life. When updating them, more emphasis should be put on the real life use of ICT.

- Teachers have limited access to open educational resources in Romanian. National and regional level decision makers should investment more in the development of this area.

- Interviewees have pointed out that the theoretical and practical aspects of the use of ICT in the training courses available are not always well balanced. Training providers should invest more in needs analysis when developing their courses.

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- The availability of ICT equipment is only a prerequisite for contemporary education, not a guarantee of success. Head masters and administration boards of schools should make explicit provisions for continuous training of teaching staff.

- Recognition mechanisms for teachers who use ICT in an effective way should be expanded and generalized. This should be based on quality specifically developed criteria.

- Base on experiences in other European countries, we think it would be beneficial to create the role of "digital leader" in each school. This role should come with attributes mostly focused on the pedagogical aspects of ICT integration.

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9. Conclusion

In recent years, Romania has progressively integrated elements pertaining to digital technologies at both policy level and at curriculum and teacher training level. Despite major national investments, the lack of monitoring and support mechanisms has made many initiatives unsustainable, with a large number of positive experiences in the integration of ICT in education, but also many experiences which cannot be referred to as innovative educational practices.

The centralized approach needs to be complemented by facilitating local initiatives and multiplying good practices. There are high expectations of completing the process of curricular reform, by launching the new framework plan for high school and by integrating relevant digital competences into initial and continuous teacher training.

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Annex. List of abbreviations

AEL - Advanced eLearning (*educational platform*)

ARACIP - Romanian Agency for Quality Assurance in Pre-university Education

ARNIEC – The Romanian Agency for the Administration of the National IT Network for education and Research

CRED - Relevant curriculum and education open to all (*project*)

ECDL – European Computer Driving Licence

ESF – European Social Fund

INSAM – Digital instruments for improving the quality of evaluation in pre-university education (*educational platform*)

IO – Intellectual output

IT - Information technology

ICT – Information and communication technology

ISE – Institute of Educational Sciences

ISJ – County School Inspectorate

MNAR – National Museum of Art

NGO – Non-governmental organisation

SEI – Digital Education System (*educational platform*)

SIIIIR – Romanian Integrated IT System for Education (*educational platform*)