DECODE

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

Transnational Report

Authors:
Magda Balica
Petre Botnariuc
Mihai Iacob
Oana Iftode
Andra Făniță

Version:
June 2018

Erasmus+

DECODE: 2016-1-IT02-KA201-024234
Co-funded by the Erasmus+ Programme of the European Union

DECODE

Co-funded by the Erasmus+ Programme of the European Union

Contents

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

DECODE

Co-funded by the Erasmus+ Programme of the European Union

Integrating ICT in the Teaching-Learning Process

1. Introduction

The present report is part of the third intellectual output (IO3) planned within the DECODE Project (DEvelop COmpetences in Digital Era. Expertise, best practices and teaching in the XXI century), an Erasmus+ KA2 - Strategic Partnerships in the field of Education.

The IO3 focuses on the exploration of what evidence base currently exists for the adoption of ICT in the classroom and it has been realized on the basis of a methodological design, tools and outputs prepared by the Institute of Educational Sciences.

This report has been compiled on the basis of five National reports, which you can access here:

National Report – England (EN)

National Report – Spain (ES)

National Report - Finland (FI)

National Report – Italy (IT)

National Report – Romania (RO)

The content of each National Report has been gathered through a combination of analysis of key national documents and interviews with practitioners. The results of these researches were used to develop guidelines for practitioners, in order to support schools to maximise the potential which digital technology offers to add value to the classroom. The guidelines focus on national education policies, training models and successful methodologies to develop school staff (teachers, headmasters, administrators, etc.) digital, methodological and socio-relational skills requested by digital era.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

2. Developing an ICT based education model

An ICT-based education model is a representation of the relationships among the education system components that derives from the general view on: a) an ICT-based quality education process, and b) the inherent values and main features of good practice.

The model selectively highlights the components and the relationships that are considered the most important for reaching the objectives. An educational model has abstract characteristics and it shows the main approaches and assumptions to develop a quality process. It has a higher level of generality as compared to specific methods and techniques and a lower one as compared to the paradigms of the domain of knowledge. A model could be illustrated in varied shapes and could be presented in an abridged manner that does not necessarily show precisely the complexity of the world, yet it has the role to facilitate the understanding of certain relationships/ factors.

Virtual learning environments and new technologies provide a natural context in which students can focus on meaningful processing of information, in order to create meaningful projects for the real environment, as well as specific tools to support various cognitive, emotional and social processes. According to Pacearca and Gerard (2012)[1], competence development implies the focus on higher-level skills and the ability to mobilize all the resources accumulated through a "*complex process of analyzing situations, identifying relevant resources (knowledge, skills, behaviors), their proper combination, their correct application and the control of the result, a process which will be easier to develop if the student's repertoire is well organized, by having faced a variety of situations and by having been well supported in learning.*"

Any model should start from some basic principles of didactic design in current education systems, namely:

- Focusing on competence development (the 8 Key Competences, competences of the 21st century: creativity, critical thinking, collaboration);
- Providing meaningful learning situations involving participatory methods;
- Integration of formal, non-formal and informal learning experiences;
- Tailoring the didactic process to individual needs and taking into account of the specific characteristics of digital natives;

[1] Gerard, F.-M. & Pacearcă, Ș. (2012) *Evaluarea competențelor. Ghid practic,* Ed. Aramis, Bucharest.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

- Openness towards multi-, inter- and trans-disciplinarity.

Possibile dimensions to highlight within the ICT-based education model:

- level of ICT integration (activities with/ through /by ICT);
- structural/ process dimension;
- quality of ICT use
    - full – in all the activities/ actions/ operations where ICT use is beneficial to fulfill the set goals;
    - optimal – there is a balance between the ICT tasks and the rest of the activities from the perspective of the intended outcomes; ICT integration is not a goal in itself and should not be implemented uncritically, discarding other relevant activities;
    - natural/ relevant – ICT use is naturally integrated in the activities flow which requires a higher level in both domain related and digital expertise;
    - efficient – there is an optimal use of resources in order to reach the goals;
    - effective – the ICT instruments facilitate the processes regulation in order to obtain the most of the expected outcomes;
- quality of the results at the level of:
    - the students' expected learning outcomes;
    - the satisfaction of the involved actors: teachers, students, managers etc.

The new digital technologies provide the teacher with relevant resources for all of his/her activities, from designing complex situations for learning/ assessesment of the targeted competences, to preparing students for engaiging with the learning situations, as well as the verification and analysis of the results. From the perspective of the educational model proposed by Pacearca and Gerard (2012), the teacher can identify the appropriate technologies for each stage of competence development:

- exploration – creating a life-like situation for a new acquisition of learning;
- analysis - focusing on a well-determined element in oder to define and use it;
- synthesis - establishing links between different elements in order to determine common characteristics, differences, specific relationships;
- reinvestment and transfer – creating a complex and meaningful situation that will allow the mobilization of various prior acquisitions in order to solve a problem.

In regard to the assessment of the level of competence development, as an extremely complex activity, it also requires the creation of mechanisms for collecting evidences and easy processing through digital systems. The

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

e-learning platforms of top training institutions have developed advanced methodologies for assessing progress in learning. The ways in which information can be collected can vary depending on the information collected, how they are organized and which is their form.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

3. Dimensions of ICT integration in education

This chapter summarizes the main features of national frameworks of ICT integration in school through action plans and particular strategies. Additional information and country specific details are available in national reports.

The education systems of the partnering countries use various school management mechanisms; in some cases, there even are local differences within the same education system. The ICT integration school action plan is a model instrument that is adapted to local contexts in order to support teachers in easily and realistically integrating ICT in their school/classroom practice. The structure, contents, specific methods will take into account the specific requirements at local level.

The integrating ICT into **Italian** schools it's an ongoing gradual process, that it's not yet fully incorporated and applied effectively. The national context regarding school digitalisation and ICT integration is framed and supported by national legislation and programes. One of the most important pillars is The Digital School National Plan promoted by the Italian government in 2015. The Digital School National Plan underlines practices for the development of students' skills and specific roles for the Headmaster and the Administrative Director, not as mere executors of administrative procedures but as protagonists of the "digital school". Another important role is played by the Digital Animator.

The implementation of the digital school innovation plan at the national level is based on a complex management network within which different Management Units are responsible with different lines of intervention – supervision, managing the funding. This system does not favor the efficiency and effectiveness of managing a comprehensive and complex plan of measures applied in an organized system of independent education institutions spread over a broad territory characterized by different conditions.

At local level, within each Regional School Office, there are special offices for digital innovation and regional and provincial booths, based on locally identified models. Also, in schools there are Digital Team Leaders recruited from the teaching staff and Digital Teams composed of the Managers, the DSGAs (the Heads of General and Administrative Services), administrative and teaching staff.

Some of the shortcoming are about the specific training envisaged for these roles at school level, and the lack of incentives for the work that the responsibilities taken on entail. There are also problems regarding the lack of

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

a serious monitoring plan of measures implemented and the lack of transparency on progressively achieved results.

In **England**, there is no national framework for the digitalization of schools and the integration of ICT, but rather a tradition of a 'bottom up' approach in education and this means that the implementation of digital learning and ICT depends on the philosophy of individual schools. In the case of schools that choose a more committed digital strategy, a digital lider is appointed and his role is to develop, implement and monitor the institution's digitalisation. Because lack of national framework also implies no national funding for ICT integration and digital tools, the money to cover staff costs for these positions has to be found from schools' budgets. This means that only the schools with enough resouses can afford to have full-time positions of digital liders. In most other cases, a teacher or IT support staff member has the responsibilities associated with ICT innovation and digitalisation included within his daily tasks. Although ICT/digital tools are also not provided by national funding, for most schools, IT infrastructure it's not an issue (only the acquisition of tools that are more expensive, like cutting-edge hardware - tablets, VR headsets etc. is problematic).

One way in which schools can improve and develop the ICT and digital integration is throgh cooperation and knowledge sharing amongst academy chains (where groups of schools work together under a common structure) and school associations, where members that are more advanced in regards to digital tools and teaching than the others share their experience and best practices and offer peer support to implement practices which have proven to work.

The Government's main interventions in this area is to monitor innovation and to promote best practices among educational leaders. Also, through the National Curriculum, the government shapes education programmes in schools. One compulsory teaching subject is computing, in which case the National Curriculum is setting out the minimum requirements for teaching ICT in schools (the approch is very practical, students beeing introduced to the principles of coding from a young age). But the school classification system in UK allows schools that reclassify themselves as an academy to have freedom in setting their curriculum and not follow the National Curriculum, just like many private schools do. Regarding standards evaluation, Office for Standards in Education, Children's Services and Skills is responsible for inspecting the standard of education in all schools and colleges in England, but an explicit assessment of the use of ICT and digital tools is not included.

As a result of all these aspects, there is an uneven level of integration ICT tools and digital learning in schools across England.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

In **Finland**, also, there are no specific laws regarding ICTs in education, but this situation is compensated by some important reforms and key projects in the field of education that include the integration and development of ICT. A new comprehensive school program aims to reorganize the working culture of schools through a system of tutor teachers and networks. The role of a tutor, who is a member of the teaching staff, is to direct other teachers to digital appropriate exploitation, to disseminate and implement ICT and digital knowledge and to be part of the basic activities of schools. Tutor teachers will be networking and colaborating with each other and will work accompanied by students.

Through this approach of tutor teachers, a new pedagogy and the digitalisation of teaching and deepening teachers' cooperation is promoted. If the goal of the program will be achieved, every comprehensive school will integrate at least one tutor-teacher. The new tutor-model allows implementation and deployment of a new one pedagogics and good practices. The education provider will collect and document the dissemination of the tutorial (digital) skills through the development plan. The implementation of the development plan will be monitored.

It is also worth mentioning that digitalisation is one of the evaluation themes of the National Evaluation Center for Education.

In the **Spanish** context, ICT education is regulated by legislation, with specific mentions about fostering digital competence and the ways and means in which technologies may be integrated in the classroom. Although, the perception is that policies related to integrate ICT in education are mostly limited to legislation and are not transposed into practical initiatives, there were a number of programs implemented that aimed to train teachers, equip both students and schools with digital tools and promote the development of digital skills.

Regardind the specific roles and responsibilities linked to integration of ICT in education, the ICT Coordinators in the **Spanish** context are, in general, involved in the implementation of digital technologies and promotion of their correct use within educations centers in Spain. But the role of the coordinators is considered differently from one autonomous region to another. In the region of Madrid, they are responsible with promoting and coordinating the actions related to the curricular use of ICT, in the region of Andalusia, they assume the role of technical adviser and organiser of training activities for students and teachers and in the Canary Islands, they support and advice their colleagues in the ICT educational process.

In **Catalonia**, the administration adopted the TAC plan, with the main objective to offer an integrated vision on ICT in education, to promote the development of digital competences among students and to facilitate the

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

integration of ICT. The philosophy behind the TAC Plan is based on shared responsibility and the involvement of the whole educational community in the process of decision-making: management team, pedagogical coordination, TAC coordination or TAC commission, department heads in the case of secondary education, school council or the Association of Students' Mothers and Parents.

In **Romania** the integration of ICT in education is framed by national legislation and was supported by a number of dedicated programs that aimed to foster students' digital competences, train teachers and equip schools with the needed digital infrastructure, but the biggest problem in the process of implementation of the so called digital agenda is the absence of a coherent strategy and of a much-needed unified vision. One of the concequence of this shortcoming is the lack of a clear image about the curent situation of the ICT integration in schools in terms of human and material resources, students and teachers' skills, methodological approaches, best practices and so on.

In regard to the organisational structure of actors responsible with the digitalization of schools and the integration of ICT in education, there are no specific roles beside the ones that are management or curriculum related, like ICT or computer science teachers and the technical support staff, which in many cases doesn't exist, particulary in the rural or poor communities where schools don't afford or don't find it necessary to secure this position.

So far, there have been vague special concerns of institutional managers for the use of ICT. There are rather isolated concerns of various teachers. Something organized at least at school level must be taken into the Institutional Development Plans, but, for now, this in not the case. It is important for a school institution to take this clear direction in the path of ICT integration, taken into account that the teacher's assessment sheet details the use of technology and each teacher is also evaluated from this point of view.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

4. Good practices in specific areas

All five IO3 National Reports include dozens of good practices in regard to the use of ICT in education. Below we have highlighted one example in each of the areas mapped by the National Reports.

Communication and literacy learning with ICT

Bradford Film Literacy Project[2]:

Bradford was the world‟s first UNESCO City of Film. In an effort to create a meaningful legacy from this status, a film literacy project was created which aimed to have a positive effect on learning amongst primary age children in the city. The idea behind the project was that film could act as a useful gateway into wider literacy learning (reading and writing) as young people are a generation who have grown up surrounded by the moving image. Therefore, by using a variety of short and long-form films, students could learn how image, sound etc. are used to build meaning and fashion a narrative. Students themselves were also encouraged to develop a short film, using hand held devices (tablets, mobile phones etc.) to capture and edit content. To guide this work tasks were set around literacy points; for example, including a scene in the film which demonstrated the use of an adverb. Hence, the project transcended the traditional use of (pre-recorded) video in the classroom. Instead it harnessed the potential of modern devices to become interactive parts of the learning experience, with learning driven by the young people. Alongside some in-school support, experts delivered CPD for teachers around the basics of film literacy, editing content etc. Not only did this mean that the teachers who took part in the training were confident to deliver the film literacy content independently, but they were also encouraged to act as ambassadors within their own schools, helping to upskill colleagues. For those schools that took part in the project, the results have exceeded expectations, with on average students‟ writing and reading literacy scores in tests improving by around four points.

[2] http://bradfordfilmliteracy.com/

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Virtual labs

Mobilitzem la Informàtica[3]

The Mobilitzem la Informàtica (Mobilise computing) experience is an optional subject in Informatics of the 4th year of ESO. The project consists of designing and programming an app for mobile devices. Students work in groups of 5 and the use of different tools and applications is considered throughout the course. The course is structured along the following lines: multimedia creations, publication and dissemination of content, and tools for communication. The didactic proposal is approaching a project through group work, focused on the design and programming of an app for mobile devices. While the development activities follow a linear process, sometimes students will have to replan or revise their previous decisions. The app should be meaningful for the students, i.e. it should provide a solution to a problem identified by the group. The definition of this problem and the tried solution are the base for all the activity. Students are asked to make a characterization of possible users, which is then a fundamental factor to consider in interface design and in the development of the provided services. Finally, it also integrates a commercial and entrepreneurial component. Different tools and applications are used throughout the process, in a contextualized and guided way, until the final product is created. Therefore, the project fosters not only the integration of ICTs in education it also promotes a very wide range of skills: audio and video processing, website creation, apps programming languages, economics and marketing concepts, cinematographic scripts, security and digital attitude, and ethical codes in the use of the TIC.

Scientific exploration through virtual environments

Operation World Heritage[4]

Operation World Heritage is a free web game opened on the International World Day of Independence on 18 April 2016. It is a web game for lower secondary students, where pupils get to know Finland's World Heritage Sites. The game takes approximately one lesson and can also be played individually. The game can be found at http://www.operaatiomp.fi

The game begins with the arrival of aliens in the Earth orbit. Military superhuman aliens want to dismantle Earth and move people to other planets. As the military power does not help, players try to save Earth by justifying the aliens

[3] http://alexandria.xtec.cat/mod/data/view.php?d=2&rid=1773

[4] https://hyvatkaytannot.oph.fi/kaytanto/2090/?q=7501ed3de354ce906a67b99361b54fbb#

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

how unique the sphere is. The right arguments change in each game so players have to think about the world heritage and its importance from many different perspectives. Also, the leader of the game (eg a teacher) has a versatile opportunity to participate in the game. To overcome the game - and to save the world heritage - players must act together as active players. The implementor of the method is Finnish Society for Cultural Heritage Education.

Virtual Reality in the classroom

Sevenoaks School in Kent is a (private) co-education boarding/day school for 11-18-year olds and in recent years the school has been able to establish a dedicated department focussed on innovation. As part of this, the school have been closely monitoring the growing affordability of virtual reality headsets and exploring the potential use of this technology in the classroom. By the start of the 2016/17 academic year, the school felt that VR had now become affordable enough to warrant investment and so began to roll out the technology into the classroom. The impact had been massive, with a range of subjects reporting an increase in student engagement and improved learning through the use of VR to explore topics. For example, the technology has been used in art and design to explore famous pictures in more detail. Students are able to render a 3D virtual mock-up of the picture and then fully immerse themselves into the scene using VR. This allows them to investigate the nuances of the image and so develop a greater understanding of meaning and technique.

Similarly, VR has also been used in other subjects as a more abstract aid to learning. An example of this is during philosophy lessons where students have used the technology to explore the French philosopher Descartes‟ hypothesis that life is a simulation. VR gave students a real taste of this by demonstrating just how much an augmented reality can blur the boundaries between fact and fiction. The school‟s use of VR has been so successful that they have included this technology in their recent „Outreach Box Project‟, which has involved the development of several technology toolkits for other schools to hire for free. These boxes are curated by the staff at Sevenoaks based on their own experience with digitalisation, something which they recognised is more advanced than in many of the other local schools (in a large part due to their bigger budget from being a private school). As a result, the focus of the toolkits has been on digital tools, ICT etc. that can add value to learning but many schools find prohibitively expensive to buy. This means that other local schools with more limited budgets do not have to invest in technology they may not use every day but can source it from Sevenoaks School when it is needed. Thus, the boxes are helping to improve the use of cutting-edge technology in education across the local area.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Posing and solving problems in the App-Era

Real Time Technologies Laboratory

The computer-based laboratory - **Real Time Technologies Laboratory (RTL) or MBL Microcomputer Based Laboratory** is among the most significant applications of the didactic uses of New Technologies. Calculator is used as a powerful measuring device, able to collect and analyze experimental data. The components of MBL are: hardware (computer, interface and sensors), software (management programs) and courseware (teacher guide, student didactic cards). Measurements are acquired in real time, without significant delay with respect to the implementation of the experiment; they are called "briefly online" and are the result of the interaction between the sensor and experimental environment, data acquisition and organization (interface, computer), according to the scheme:

DATA COLLECTION / TRANSDUCTION ⇒ PROCESSING ⇒ REPRESENTATION

The MBL offers a connection and integration tool between two traditional moments in the teaching of physics: the first one, which is based on lessons and exercises, aimed at conceptualization, formalization, to the schematization of different and more or less complex phenomena; the second one, which is based on laboratory activities, typically aimed at bridging the gap between theory and experiment and at encourage attitudes of exploration and discovery. The potential educational uses of these tools are in the possibility to change the learning environment, which is realizes in class moving the center of the educational action from education to the direct construction of knowledge by student. The role of the teacher is modified: the control of formulated by the student hypotheses can be done by the student himself and by the class, through the analysis of experimental data concerning the analysed phenomenon. The MBL (Microcomputer Based Laboratory) experiments can significantly enrich the activities of the science laboratory.

Virtual communities

eTwinning

eTwinning promotes school collaboration in Europe through the use of Information and Communication Technologies (ICT) by providing support, tools and services for schools. eTwinning also offers opportunities for free and continuing online Professional Development for educators. Launched in 2005 as the main action of the

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

European Commission's eLearning Programme, eTwinning is co-funded by the Erasmus+, the European programme for Education, Training, Youth and Sport, since 2014.

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"[5] 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.

[5] http://isjvn.vn.edu.ro/utile/informatica.php

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

5. Teacher training

Aquisition of ICT competences for teachers can refer to: a) the acquisition of comptences related to the use of ICT by teachers for their own use and b) the acquisition of comptences related to the use of ICT in creating an educational environment for students. The emphasis of the data collected through the National Reports was on the second type of competences.

In **Catalonia**, the training and accreditation of digital competences must be an overarching component in the teaching of broader pedagogical competences, and the teacher needs to be able to use ICT appropriately in all areas of their knowledge. The Catalan PICDD project (presented in the IO2 National Report) analysed the initial and continuous training teachers in ICT with the goal of proposing improvements. In addition, the project defined five areas or dimensions of digital teacher competences that should be considered in any teacher training in ICT (Generalitat de Catalunya, 2015):

1. Design, planning and didactic implementation.
2. Organization and management of educational spaces and resources
3. Communication and collaboration
4. Ethics and digital citizenship.
5. Professional development

In interviews conducted with stakeholders it was stated that public money alloted for the training of teachers is a very important factor for improving the education system. Teacher training should be, in their opinion, compulsory, continuous, and increasingly inserted within the teaching staff working hours. Nevertheless, said efforts must not fall entirely on the teachers shoulders but also on education bodies and centers that must provide the resources that currently teachers lack or have lost. There is a consensus about the need for teachers to be competent in the instrumental and methodological use of ICTs in education. In relation to accreditation of competencies related to ICTs, interviewees criticised that the form of teacher accreditation in ICT prioritises „attendance" of very standardized and decontextualized courses, taking too many hours, rather than „usage" capabilities. Several interviewees pointed out the lack of a clear accreditation system, noting that it"s necessary to create mechanisms for the accreditation of these competences that allow the teachers to demonstrate that they have reached a set of established levels, appropriate to each task

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The principle of allowing teachers time to carry out continuous professional development (CPD) is well embedded in the **English education system**. However, the content and format for this training varies from institution to institution and depending on individual teachers‟ needs. In an ideal world, all teachers would be able to take time out of class to learn about the latest developments in technology but there are budgetary issues to consider before releasing teachers for any CPD.

The most common approach highlighted during the research sees institutions look internally within their existing resources to pool knowledge when developing CPD. This can include identifying staff with good ICT skills and knowledge and appointing them as „digital champions‟ to promote benefits and develop the skills of their colleagues. Some institutions have also looked to harness the skills of students in this regard, forming digital student councils or asking for volunteer students to help support staff and other pupils to understand how to make full use of the digital tools available to them.

The field research also showed that CPD around ICT and digital skills was far more developed in those institutions where dedicated digital leaders had been appointed. Having these skilled specialists involved in the day-to-day delivery of a digital strategy means that a more coordinated and all-encompassing approach can be taken to CPD.

Findings from the national interviews around CPD showed that age and subject taught had far less of a bearing on the uptake and development of digital skills than might be expected. Instead, staff attitudes were cited as the main challenge which schools faced. For some staff the benefits of shifting to amore digital approach to teaching were not obvious, whilst others were unwilling to learn new skills (due to time pressures or lack of perceived impact).

In **Finland**, although the teacher education has been trying to take a long time for the development of information and communication technologies (ICT) training for teachers-students, a number of studies have demonstrated that it has not become natural daily activities in the teaching process in schools. Therefore, the further development of basic and continuing teacher training remains challenges. Practically there is a wide range between schools in the practical application and teaching of information and communication technologies. The National Board of Education has also funded teacher further training in ICT

Since the 1990s, the Ministry of Education has published the use of information and communication technologies Strategies (KTT 1995; SETRIS 2000), on which schools and universities have been designed their own ICT strategies. The main objective of these strategies has been to integrate the pedagogical use of ICT for all courses and traineeships of the teachers‟education. The degree requirements have become the basic skills of ICT (so called

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

„Driving license of ICT") supporting courses, courses for versatile working methods and pedagogical use of ICT and mobile devices. Universities have been developed different physical and virtual learning environments.

Pedagogical departments are currently working on similar development work how to integrate the topics of social medaia in teacher training programmes from point of view of mobile learning and social media support, and to benefit personal learning environment and network - Personal Learning Environment (PLE), ePortfolio, Personal Learning Network (PLN) - perspective.

The Finnish IO2 National Report has described projects Ope.fi 1, Ope.fi 2 and Ope.fi 3 which were developed for training and supporting of teachers' ICT skills.

According to the New Comprehensive School Program (Uusi peruskoulu – ohjelma, 2016) each Finnish elementary school trains a tutor teacher who guides their colleagues to the digital world and new pedagogical solutions. During 2017 - 2019, 2 500 tutors will be trained in comprehensive schools to develop the use of digital tools. This would be an average tutor for every 220 pupils.

The DIGIOPE Project aims to get information on the current state of the digital guidance skills and cooperation in vocational education and training staff. The project also provides information on promoting reform in vocational education and identifying future needs. The survey is carried out by the HAMK Vocational Teacher Education School. During the spring of 2017, a large-scale inquiry will be conducted, which will be deepened by expert interviews.

In **Italy**, the National Digital School Plan (2015) was probably the first important moment of reflection about digital didactical practices at school in the institutional world. It constituted the first moment of reflection on the educational processes, but also on the type of organization, school environment, spaces, training of teachers and real connection between schools and the world of work. However, like all reforms, it has clashed with an organizational and educational context, often not ready to absorb and welcome the changes, resulting in "*a series of problems that clash, both with a very cumbersome and demanding organization of the ministry and, with the organization of schools*" (interview 4), hindering the pervasive relapse of initiatives that remain occasional experiences, difficult to capitalize.

Among the most innovative actions of the recent PNSD, as part of the continuous training of teachers, was the establishment of the role of the digital animator, responsible for supporting colleagues in the process of incorporation of ICT in teaching; an opportunity for each institute to set up the guidelines for ministerial guidelines. But this role suffers from some "system" limits, among which the most relevant is the lack of integration with the entire teaching body, linked to forms of disregarded recognition of retributive nature and role. "*The Digital Animator is abandoned by*

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

the rest of the teaching staff who does not give him great support, he does not have his own budget. The school takes € 1000 a year but not him. So, the digital animator has a big workload, conceptually important, but it is not supported by a strong mandate" (interview 6).

In Italy the teacher is not subject to evaluation and monitoring actions in progress and ex post. The verification of the impact of teacher training is only formal and not substantial, having an administrative and reporting nature. An attempt to overcome is the platform S.o.f.i.a of MIUR, where individual teachers who benefit from training, have the opportunity to give an assessment to their training, involving thousands of teachers can be a significant first step in giving value to training.

In **Romania,** the methodical skills needed to integrate ICT into lessons can be developed through teacher training courses during initial training, 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 during 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 European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the
Erasmus+ Programme
of the European Union

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

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the
Erasmus+ Programme
of the European Union

6. Approaches to the evaluation of ICT integration in schools

Variations within the systems of the five countries under analysis, in regard to quality assurance and evaluation of ICT integration in education, is considerable. This reflects the centralisation of different functions within these systems: England, Finland and Italy have a decentralised approach, while Spain and Romania have a centralised approach. Below you can find a brief summary of the QA practices in the five participating countries.

In **England**, although there is no standalone evaluation or quality assurance tool issued from a governmental level to assess the implementation of ICT and digital resources in classrooms across the country, the use of technology is a factor which informs Ofsted inspections. In particular, the extent to which a school is using cutting-edge and impactful new technology forms part of the assessment of the quality of an institution's teaching during visits. Ofsted inspectors only visit most schools every two to three years (depending on how successful their previous inspection was). The problem with this is that these are more subjective, individual checks, which means that there is a lack of a common criteria on a formal level to help decision makers, practitioners etc. benchmark schools across the country against one another.

One national body which can offer support to schools to help them ensure quality adoption of ICT is Naace, through their self-review framework. This framework encourages schools to reflect on their level of ICT adoption, with a focus on gathering evidence and making improvements in order to more clearly demonstrate the quality which these tools add to teaching. To strengthen the impact of the self-review framework, Naace also offers schools the possibility to apply for a Naace ICT Mark, which is a recognised standard for schools wanting "to demonstrate both effective and mature use of technology" and can be applied for once a school has achieved a level two ranking in all six aspects of the self-review framework. These marks last for three years, after which a school has to apply to renew the award. These committed institutions also often possess a full-time digital leader. Therefore, the tasks of evaluation and quality assurance are carried out by these staff members, meaning that comprehensive strategies and resources can be developed, with capacity to undertake extra tasks such as apply for the ICT Mark. Yet, where this role does not exist, these tasks often fall under the more general ICT co-ordinator, who may have many other tasks associated with the school's overall ICT infrastructure and policy.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The external evaluation of schools in **Spain** is the responsibility of the Autonomous Communities and the Ministry of Education, Culture and Sport (in the case of the Autonomous Cities Ceuta and Melilla, and of Spanish schools abroad). The main body of external evaluation is the Education Inspectorate, dependent on the associated regional ministry/department of education (although some regions are divided territorial delegations), staffed by civil servants who act as school inspectors. The Inspectorate controls and supervises educational institutions and their programmes, teaching and school management, continuous improvement of schools, and the compliance with legislation, regulations and official guidelines. Here are some examples:

> In April of 2017, the education inspectors of the **Canary Islands** gathered to participate in a working meeting entitled *La innovación educativa. Un reto para la Inspección de Educación* (Educational innovation: A challenge for the Education Inspection), where the Modernization Plan of the archipelago's governmental department for Education and Universities was debated. ICT support was considered as an integral part of efforts to adapt education to the new social contexts.
>
> The Strategic Plan 2013-2017 of the **Navarra**'s Educational Inspeccion Service, a body of the region's Department of Education, contains a list of core strategies for the service. The Plan's strategy number 9 mentions promoting methodological innovation following today's cultural and technological changes (Servicio de Inspección Educativa, 2013).
>
> In **Catalonia**, as the main agent of supervision, evaluation and advisory of educational centers, the work of inspectors is central for positive and sustainable educational innovation. The *Subdirecció General de la Inspecció d'Educació* (the Catalan regional inspectorate) published an analysis of the *Suport Escolar Personalitzat* (SEP, Personalized School Support in English) initiative, which provides help to the students in need in order to fight insuccess. In the document, the usage of new technologies for student engagement, digital narration, and project-based work is considered a good and important organizational and methodological practice.

The Common Digital Competence Framework for Teachers, an initiative by the National Institute of Educational Technologies and Teacher Training (INTEF) of the Ministry of Education, Culture and Sport (MECD), holds regular meetings in which the project's progress is assessed by a group of experts, researchers, other institutions and stakeholders. The Framework devised the Digital Competence Portfolio for Teachers, an online service to endorse and certify the Digital Competence of Teachers.

In **Finland,** the earlier quality assurance was largely based on norms and inspections until the 1990s. The education administration was decentralised early 1990s in Finland after abolishment of school and textbook inspections. The current quality assurance system in Finland comprises the quality management of education providers, the national steering of VET and external evaluation. There is strong focus on both self-evaluation

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

and peer evaluation of schools and education providers and national evaluations of learning outcomes. Digitalisation is one of the evaluation themes of the National Evaluation Centre for Education KARVI.

Local autonomy in education is extensive in Finland and education providers are responsible for the practical teaching arrangements as well as for the effectiveness and quality of the education provided, also on a voluntary basis. National authorities support the quality assurance process by providing tools and support, such as quality awards in VET and quality recommendations. The activities of education providers are guided by objectives laid down in legislation as well as the national core curricula and qualification requirements. The system relies on the trust and proficiency of teachers and other personnel.

All personnel are encouraged to develop their work as well as participate in the quality improvement of their institutions. Teaching personnel are required to hold a master's degree. National evaluations of learning outcomes are done regularly according to the evaluation plan of the Ministry of Education and Culture. From the schools' perspective, the evaluations are not regular as they are sample-based.

Teachers' ICT skills are followed and assessed according on the self-assessment method by an e-platform (2012–2017). The school leaders have the other e-platform for following the digital environments and development needs in their schools with a self-assessment tool.

In **Italy**, at national level, there are still no clear guidelines and procedures that accompany the education system to integrate digital innovations in educational processes and practices. In 2016, the Ministry created the School Single Data Portal for free access to data about: schools, students, school staff, school buildings, national assessment system and national operational program (PON).

In the same way, there are still no public monitoring and evaluation results regarding the efforts made through the PNSD. While it is possible to reconstruct some important stages of about a working progress process. In 2016 an exploratory research was carried out aimed at detecting teachers' needs, uses, practices and digital skills (Capogna, Cocozza, Cianfriglia, 2016) with the aim of taking a picture of the digitalization process in teaching at time when the PNSD he took his first steps.

AGID takes care of a collection of Quality Handbooks for ICTs, acting as a point of reference for those who work in the PA.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The evaluation actions related to the PNSD investments have so far focused on the accounts aspects. However, in note no. AOODGEFID0012810 of 10.15.2015 the Minister illustrates the National Operational Plan 2014-2020 for the school, clarifying the financed actions, included in Axis II, named *Infrastructures for Education ERDF*, and which defines a series of sub-actions related to multimedia environments.

In **Romania,** new technologies have been included in the first evaluation standards, which were elaborated in 2005. They have recently been reorganized and reduced in number: for accreditation, the descriptors were brought down to 133 from the original 611, while for reference standards the descriptors went down 450 to 403. In 2017 the National Quality Assurance Agency (ARACIP) launched a public debate on these updated standards for authorization, accreditation and periodical evaluation.

The new standards make explicit reference to "Availability of ICT equipment". When a school receives its authorisation, the standards are in terms of projection (e.g. "*Is there an allocated budget*?"), while when it receives its accreditation they are referenced in terms of availability and functionality. For each category of standards there are compulsory minimal requirements, for both authorisation and accreditation, and requirements leading to an optimal functioning level. Some indicators (No. 19 and No. 20) specifically reference the way ICT tools are integrated in educational practices.

ARACIP has created a platform through witch all schools manage quality assurance. The platform aims to become a virtual community. With the support financial support from the European Social Fund, ARACIP has trained school managers and quality assurance managers, it has developed handbooks and guidebooks and it has organized events and conference. Additionally, a body of *counselling trainers* has been created. They assist schools on QA issues and can be found and accessed through a registry.

During the 10 years in which it has directly engaged with schools, ARACIP has acquired experience which has led to the development of standards that are more in tune with school realities.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

7. Recommendations

While most of the recommendations included in the National Reports were designed for a specific context, they all had an underlying theme which can be adapted to other contexts. The following considerations are based on the recommendations of the National Reports for different levels o intervention (policy, school management, training and classroom interactions) in specific countries, but they have been rephrased in a way in which they can act as a checklist for other countries/contexts.

Policy

Some countries are confronted with instability in the field of educational policies, which is could in turn be reflected in the role of ICT in schools. There might be a need to update Education Laws in regard to medium and long-term perspectives on pedagogic issues.

The onus for addressing uneven development and integration of ICT should not fall on the schools themselves. Institutions are already overworked and under financed and so are in need of external (government) support when it comes to digitalisation.

Most often, threats to the integration of technology in pedagogical settings are related to insufficent investment. If there are no clear and transparent mechanisms for investment, schools will be left to fend for themselves. In practice, this means that only those schools with more generous budgets (e.g. private schools) or with a leadership team which takes an active interest in technology will actively pursue an innovative digitalisation policy.

It would be highly desirable to establish a national level mechanism that would make it possible for schools to constantly update ICT infrastructure and equipment (e.g. access to ultra-wideband, connectivity and internal cabling in each school). This would go a long way in bridging the gaps that have developed between schools due to local economic factors.

National policy is perceived as beneficial in providing a clear framework for schools to aim towards and benchmark themselves against.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Policy makers need to also address the issues pertaining to privacy and security while using technologies.

School

ICT should be used under open management paradigms that improve and simplify the everyday managerial and administrative activities in schools.

There are significant differences in the resources that schools can access, depending on a number of local factors. Therefore, the practical methods and actions through which new technologies will be integrated in each school should be based on a plan contextualized to the local reality.

Head masters have a central role in the school's innovation process. It is considered essential to devote special attention, by the administrative structure, to this category in terms of recruitment, training, entry into the role, assessment and continuous empowerment. The head master is a "bridge" which ensure dialogue between the administrative and educational sectors and to put any innovative practice in the system. They must be the first to value the work and commitment of the most open professors to the incorporation of learning and knowledge technologies in the teaching-learning process.
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. One recurring recommendations throughout the National Reports concerns assigning a dedicated person (“digital leader”), at school level, to deal with the pedagogial aspect of the integration of ICT.

Maybe in the future schools can use the assistance of artificial intelligences to organize the functions of digital environments in the schools.

Training

Digital skills should be taught and required in teacher training, just like any other pedagogical skills. In some contexts, 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.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Already there have been many projects and initiatives which have developed digital toolkits and dedicated continuous professional development. There is a need to accredit these innovative projects and disruptive pedagogical practices around ICTs use, in order to mainstream their use.

Collaborative teacher professional development initiatives need to pe further developed, supported and promoted.

In the ever-changing landscape of ICT for educational use, training providers should invest more in needs analysis when developing their courses.

Classrooom

Some ICT related curricula tend to focus on technical aspects and programming, rather than the acquisition of ICT skills for daily life. More emphasis should be put on the real-life use of ICT, critical thinking, problem solving, learning to learn, communication and collaboration, and digital citizenship at a local and global level.

Software has usually been developed for use in management tasks, such as creating documents and keeping official records. As important as formal information management is, in the schools the usability and accessibility of learning environments for students is a lot more important.

Schools should avoid the constraints of restrictive intellectual property rights by using open source software and open educational resources whenever available. In some contexts, teachers have limited access to open educational resources. National and regional level decision makers should investment more in the development of this area.

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

Digital e-books have sustainable costs and a concrete advantage for students (e.g. in terms of transport and use of the text). Their use should be expanded, throughout the educational sysystems.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

8. Final considerations

As schools feel the pressure of a changing technological environment, projects such as DECODE try to support them to achieve their goals.

The first step in any successful endeavour for a school manager is to develop a **clear vision regarding the integration of new technologies**. This means understanding the benefits and limitations of the use of ICT, while taking into account local social, economical and cultural factors. The first two chapters of this report and the *Guidelines for educational institutions* should offer some insights into what it means to have a clear vision.

When developing an intervention, it is paramount to have an updated image of **the needs of stakeholders** (pupils, teaching staff, administrative personnel, etc.). This should come from constant dialogue with these stakeholders and small-scale surveys which reflect the local context. The DECODE project is conducting its own survey of over 2000 education professionals across Europe (aprox. 400/partner country), which will be available in August 2018.

Mapping the resources available at local, regional, national and transnational levels will provide school managers with information on how to plot their way forward. Previous intelectual outputs of the DECODE project and parts of the current report have pointed out how these maps look like in different context.

It is up to each school manager to create **an action plan,** with specific roles and the distribution of tasks. They should have **verifiable goals** to be reached at the end of the implementation period.

Finally, any intervention should include mechanisms for **monitoring, evaluation and quality assurance**. Chapter 6 of this report offers some pointers as to how different educational systems have approached these issues.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.