Spain

Country Report on ICT in Education

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1. THE EDUCATION CONTEXT

1.1. Key educational challenges and priorities.

The main educational challenges for schools in Spain are established in the present Educational Law “Ley Orgánica de Mejora de la Calidad Educativa”, (LOMCE), which has completed its implementation in all the educational stages during the academic year 2016-2017.

This Educational Law establishes some objectives and tasks especially addressed to schools, from which the following challenges derive:

- To respond to the diversity of the students and to contribute in an equitable way to the new challenges and difficulties that this diversity generates.
- To ensure that all students develop their skills to the fullest, within a framework of quality and equity.
- To develop and adapt, if necessary, the curriculum and measures of attention to the students’ diversity, adapting them to the characteristics of their students and their educational needs.
- To implement pedagogical and methodological measures to cope with the different learning rhythms and styles of the students, promoting teamwork and their ability of students to learn by themselves.
- To engage families and students in the educational process in order to facilitate the students’ educational progress.

The role of ICT regarding schools, as established in the Educational Law, will include the following considerations:

- Schools shall prepare students to live in the new knowledge society and to face the challenges that stem from it; This is established in the digital competence included in the Law. This competence is included in the minimum contents established officially for the different educational stages, so all subjects have an approach to it. It is also included in the assessment of the students in each subject. For further information, refer to the Educational Law (in ES).
- The Virtual Learning Environments used in state schools will facilitate the implementation of specific educational plans (class programs) designed by teachers to achieve concrete curriculum objectives and contribute to the extension of the classroom concept over time and space;
- Schools will promote the students’ access, from any place and at any time, to their school Virtual Learning Environment, taking into account the principles of
universal accessibility and design for all and observing the applicable legislation regarding intellectual property.

- Schools will promote the use of ICT in the classroom as an appropriate and valuable didactic means to carry out teaching and learning tasks.

### 1.2. Education Reforms

Based on the efforts made in previous educational systems, Spain has achieved the goal of universal education, which is supported by the following facts: 97% of 3 year-old children are in schools, the right to education is included in the Constitution, guaranteed basic and free compulsory education, free post-compulsory secondary education (both academic and Mid-grade vocational training).

With this goal attained, there are new challenges the Spanish education system faces:

- One in four students do not continue their education beyond compulsory education, (age 16) or do not obtain the Compulsory Secondary Education Certificate.
- In terms of academic results, 15-year old Spanish students performed below the OECD average in PISA 2015.

The latest reform of the Educational law for the entire country is the **Organic Law to Improve the Quality of Education**: “Ley Orgánica de Mejora de la Calidad Educativa”, (LOMCE). This reform started its implementation implemented in schools in 2014-2015 school year and is fully implemented in 2017-2018 school year. It modifies the previous “Ley Orgánica de Educación” (LOE), dating from 2006. The reform proposed by the LOMCE is based on evidence and gathers the best compared practices (PISA (2009), EUROSTAT (2011) and Official data collected by the MoE).

The reform of the educational system sets the following targets:

- To increase the number of students that successfully complete Compulsory Secondary Education.
- To reduce early drop-out rates in compulsory educational stages to achieve the European average rates (11% according to Eurostat 2016 data).
- To reduce the overall youth unemployment rate.
- To facilitate and encourage the access and increase the number of graduates in vocational studies.
- To improve the students’ performance in international tests.
- To establish assessment procedures by means of external standard evaluations.
- Allow schools higher level of autonomy.
- To improve the performance and skills of the students in foreign languages.
2. DIGITAL EDUCATION POLICY

2.1. National/ regional digital education policies

The ICT programmes at national level are coordinated by the Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado (INTEF). INTEF is devoted to ICT in education in the Spanish Ministry of Education (MoE). Since 2012, the Spanish MoE is working on the development of a national ICT plan for schools: the “Plan de Cultura Digital en la Escuela”. This plan comprises five main lines of action:

1) Connectivity: School access to Internet: taking advantage of already exiting nets. In this respect, the Spanish MoE launched a dedicated project in 2015: School Connectivity (along with other Ministries), to provide Internet access using ultra-fast broadband networks (100 Megabits per second) to primary and secondary schools, paying particular attention to those schools with poor connectivity due to their location. Up to the present moment, thirteen regions have already joined this action to improve connectivity in the schools in their areas.

2) Standards and interoperability between the management systems of the different educational administrations and the rest of systems and tools of the educational ecosystem, as it is the case of the Virtual Learning Environments. Bearing this in mind, INTEF has created the “Interoperability Office” that coordinates actions related to interoperability and standardization. The technological platform used for these purposes is called Node for Educational Interoperability, which allows supplying, in a modular manner, web services used by the different Educational Administrations and authorized entities. For example, common academic digital records for students and teachers have already been created and proposed to all the regions. The “educational ecosystem” embraces all the ICT educational services: system for the identification of students, School library management system, Virtual Learning Environments, academic management system, etc. This project establishes the basic standards so that the different systems in the regions and the central government (which are the educational administrations in Spain) are interoperable.

3) A collaborative site of OER. as a development of the previous “Agrega_2” platform. The Procomún platform provides access to the national repository of digital Open Educational Resources (OER) shared by the Spanish Ministry of Education and the regional Educational Administrations. This repository hosts digital teaching materials in a standardized way through common metadata (LOM-
ES). It is consistent with the curriculum of non-university educational stages and ready to be easily used in the classroom as well as modified and adapted to different contexts and needs. Download formats of learning objects favor the integration in LMS platforms. Procomún is formed at present by more than 27,600 teachers contribute Procomún, with 176 community groups and more than 20,980 uploaded articles and 90,235 educational resources.

Moreover, INTEF integrates the National Centre focused on OER: Cedec (National Centre for Curricular Development with Free Software Systems). Cedec is an institution which is part of the Spanish Ministry of Education and is partipated by the Extremadura's regional government. One of its main tasks is to create OER for Compulsory Educational stages (K12). In addition, Cedec also promotes OER and open education ideas between teachers, school administrators and policy makers, for example through eXelearning, an authoring and content creation tool. It is an easy to use open-code tool that allows to adapt educational materials to the needs of teachers and students.

4) **Teachers’ digital competence:** INTEF has published the latest version of the "Common Framework for Teaching Digital Competence" (ES EN, September ’17), which has been developed in collaboration with regional educational administrations. This framework is a standardized proposal that specifies teachers’ digital competence through descriptors of 21 sub-competencies organized in three levels and five competency areas. The five competency areas are 1. Information and data literacy, 2. Communication and collaboration, 3. Digital content creation, 4. Safety and 5. Problem solving. The initial draft was a translation and adaptation to the teaching profession of the model proposed by IPTS (European Commission) for any European citizen in connection with the 2020 Digital Agenda.

Moreover, INTEF provides Spanish teachers with face-to-face and online training opportunities to improve teaching and ICT skills. Face-to-face opportunities include summer courses, congresses, conferences, professional stays and other types of activities provided by universities or other institutions. As far as online teacher training is concerned, INTEF’s offer includes online courses – offered through a Moodle platform – and MOOCs, NOOCs (Nano massive open online courses) and SPOOCs (Self-Paced Open Online Courses).

Various actions were established to promote Teacher Professional Development and Digital Culture at School and are intended for non-university teachers. All of these national actions (connectivity, interoperability, OER and commercial resources, Teacher Digital Competence and Training) are completed and made specific with regional plans or activities which vary depending on the Autonomous Regions. INTEF is also involved in
International projects that facilitate information, support and coordination with Autonomous Regions. For example, **eTwinning, Scientix, MENTEP, TeachUP**, etc.

### 2.2. Responsibilities

The Spanish administration is a highly decentralized system where Autonomous Communities administer resources and legislate under the general umbrella of national law. In the case of education, all Autonomous Communities are fully responsible for the schools in their territory, which includes the promotion of ICT in schools. This provides a varied setting with as many plans as Autonomous Communities, addressing topics from connectivity in schools, software provision, school management software, open software adoption (with different customized Linux distributions) to teacher training plans, amongst other issues.

The Spanish Ministry of Education, Culture and Sport coordinates several initiatives at national level, in collaboration with the Autonomous Communities, through the **National Workgroup for Learning Technologies**. These initiatives include the ones mentioned in Section 2.1 National/ regional ICT policies. These policies are embedded in the national ICT plan. The “**Plan de Cultura Digital en la Escuela**” started in 2012 and is in its final phases). The plan requires collaboration with the Autonomous Communities for the design and implementation of the different actions in order to bring them in line with the ongoing related regional plans, since the regional authorities are responsible for the allocation and administration of resources in all cases.

Each action line of the “Plan de Cultura Digital en la Escuela” is articulated through a Committee of Experts formed by the MoE, several representatives from the Autonomous Communities and external experts.

### 2.3. Specific digital education initiatives

a. **Student identity management and School management systems**

The **Node for Educational Interoperability (since 2015), “Nodo de interoperabilidad educativa”**: a technological platform designed to provide web services to achieve interoperability between computer systems amongst all the regional educational administrations. [For more information.]

b. **New learning spaces**

In 2017, INTEF has published the Spanish version of the 5 modules of the **Future Classroom Toolkit** so several schools from different Autonomous Communities (Canarias,
Comunidad de Madrid, Aragón, Comunidad Foral de Navarra, Comunidad Valenciana and Principado de Asturias) are implementing these new classroom scenarios. INTEF has also launched an FCL where training takes place. 
For more information, and also here.

c. **Game based education**
Barcelona Games World in collaboration with the Spanish Ministry of Education (represented by INTEF) and GAME shops launched in August 2017 the first national contest to create a repository of good educational practices with videogames. The resources are shared in a community in Procomún. You can also find in Procomún educational resources connected to Game Based Learning and INTEF also offers online teacher training. For more information: Barcelona games world, INTEF blog about game based education, Procomun website.

d. **Implementation of computing, coding, computational thinking initiatives**
INTEF created in September 2017 the Working Group “Programming, Robotics and Computational Thinking in the classroom” with the participation of the Autonomous Communities, The aim is to explore best practices around the country, analyze them and make a proposal to include these skills in the official curriculum for the whole country. This Working Group has already launched a [website](#). The website presents an overview of the actions and initiatives in [Canarias](#), [Castilla y León](#), [Cataluña](#) and [Navarra](#). In 2015, Cataluña launched the [mSchools project](#) supporting the use of digital technologies into the classroom innovative activities such as “Mobile app design” used in secondary education schools.
As for private initiatives, since 2012, “[programamos](#)” focuses on the promotion of computing, coding and computational thinking in education.

e. **Self- or peer assessment tools/frameworks**
The latest version of the “[Marco común de competencia digital docente](#)”, the Spanish assessment tool for teachers’ digital competence is based on DIGCOMP and coordinated by INTEF. As part of the project “Plan de cultura digital en la escuela” the assessment, published in September 2017, includes an online self-evaluation tool ([portfolio](#)) for teachers.

f. **Tests (ICT or non ICT based)**

In Castilla y León, there are specific tests for teachers that can self-assess their competence in “[Red XXI](#)”. In Andalucía, teachers and students can access “[Andalucía digital](#)” to test their own citizen digital competences, as well as in País Vasco, where
they can access “Ikanos”. Similarly, in Catalonia any citizen over 16 can assess their digital competences in “ACTIC”.
### 2.4. Digital education priorities

<table>
<thead>
<tr>
<th>Area</th>
<th>High priority</th>
<th>Medium priority</th>
<th>Low priority</th>
<th>Reference to policy action measure (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A: Digital Competence Development</strong></td>
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<tr>
<td>Developing measures to support digital competence of future teachers</td>
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<td>Developing measures to support digital competence of in service teachers</td>
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<td>Developing measures to boost youth employability and entrepreneurship</td>
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<tr>
<td>ICT for accessibility and inclusion: early school leavers, migrants, special educational needs etc.</td>
<td>x</td>
<td></td>
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<td><a href="http://www.centac.es/">http://www.centac.es/</a></td>
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<tr>
<td><strong>B: Curricula and Assessment</strong></td>
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<tr>
<td>Developing digital competence/media literacy of students</td>
<td>x</td>
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<tr>
<td>Developing computer/programming skills/computational thinking skills</td>
<td>x</td>
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<tr>
<td>Developing key competences ¹</td>
<td>x</td>
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<tr>
<td>Developing 21st century skills (critical thinking, problem solving, communication, collaboration, creativity and innovation)</td>
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<tr>
<td>Assessing with ICT/ICT based exams</td>
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<td><strong>C: System-wide innovation</strong></td>
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<tr>
<td>Developing measures to support school leaders in the integration of ICT</td>
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<tr>
<td>Piloting and validating innovative uses of ICT</td>
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<tr>
<td>Mainstreaming ICT in schools</td>
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<tr>
<td>Monitor and research digital learning in schools</td>
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¹ See EC Key competences for lifelong learning: digital competence, math science technology, communication in mother tongue, communication in foreign languages, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression. [http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm](http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm)
Learning analytics (using digital technologies and data to support learning) | x |

**D: Mobile Devices**

Use of tablets | x | Samsung Smart School Project and mSchool program
Use of mobile phones | x |
Bring Your Own Device | x |
Cloud computing/services | x |

**E: Use of digital learning resources**

Developing educational content repositories/metadata | x |
Supporting the development of open educational content and resources | x | eXeLearning (http://exelearning.net)
Supporting the development of educational content/resources provided by publishers | x |
Promoting teachers’ use, creation and sharing of educational resources | x | Procomún (https://procomun.educalab.es)

**F: Learning environments**

Developing/adapting flexible learning spaces | x |
Linking formal, non-formal and informal learning using ICT | x | http://laaventuradaprender.educalab.es/
Providing equitable access to ICT (infrastructure, devices and content) | x |
Providing a safe learning environment to students and teachers | x | Resources: http://educalab.es/intef/tecnologia/infraestructuras-
3. INTEGRATION OF DIGITAL TECHNOLOGIES IN THE CURRICULUM

3.1. Digital technology based assessment

As for the students’ assessment, the MoE is developing a pilot project to explore the possibilities to implement digital versions of the end-of-stage tests (online and offline) which are compulsory for all students in Spain. Seven Autonomous Communities are involved in this pilot. Apart from these official tests, the student assessment by using ICT depends on each school.

3.2. School improvement with ICT

A line of action has been introduced in INTEF in order to explore a possible framework of digitally competent institutions following the JRC framework. This will be tackled during the school year 2017-2018 in the Working Group for digital competence in education, which is shared with experts from the autonomous communities.

Moreover, the Spanish Ministry of Education cis participating in the European project MENTEP (Mentoring Technology Enhanced Pedagogy). The project aims to develop a reliable, user-friendly and sustainable tool for teachers to self-assess progress in technology-enhanced teaching (TET) competence. Thus, schools will be able to improve by taking into account the real level of their teachers regarding TET competence. The project has just finished its pilot phase during 20016/2017 and it is at the results analysis stage and will soon be ready to be fully launched.

3.3. The curriculum framework

The Spanish MoE establishes a minimum curriculum for compulsory school levels, which is shared by all Autonomous Communities. The centralized established curricula consists up to 65% of the total curriculum, except in those regions that have another official language besides Spanish, where it takes up to 55%. The regional educational authorities in each autonomous community develop the rest of the curriculum so to expresses their values and local characteristics. The curriculum is arranged in subjects and its main
elements are the objectives, competences, contents, methodological approach, learning standards and evaluation criteria, with references to the European Key Competences Framework.

3.4. Digital technologies in the curriculum

In primary and secondary education, ICT is considered as a key competence and is covered in all subject areas of the curriculum. One of the main goals in primary education\(^2\) is to “begin to use information and communication technology and develop critical awareness of the messages sent and received”.

As a separate subject, ICT is first introduced at Secondary School level\(^3\) (7th to 10th grade): students can study “technology” (which is partly devoted to computer science) as an optional subject. In addition, ICT is offered as an optional subject in the 10th grade. In secondary education, it is established that students must “develop basic skills in the use of information sources to acquire new knowledge and basic training in the field of technology, especially in information and communication technologies”. Furthermore, goals related to the use of ICT are detailed within the curriculum of every school subject.

In mathematics, for instance, one of the defined goals is that of “using information technologies for conceptual analysis and the recognition of the properties of functions and graphs”. These goals aim at improving student competences in the use of ICT as a means of obtaining and processing information as well as a way of expressing themselves.

3.5. Students’ digital competence

Targets can be divided into two categories: those that are subject related, like the ones expressed in section 3.4, and the more generic ones, which coincide with the digital competence of the European key competences framework.

According to the present Spanish Educational Law, ICT competence involves the creative, critical and secure use of information and communications technologies to achieve objectives related to work, employability, learning, use of free time, promote inclusion and participation in the society. It requires basic related specific language skills: textual, numerical, iconic, visual, graphic and sound as well as their patterns of decoding and transfer. This involves knowledge of the main tools in ICT such as coding and programming, together with an access to sources and information processing, and knowledge of the rights and freedoms in the digital world (copy rights for example).

\(^2\) Official detailed document (in Spanish) for minimum curriculum for the primary level

\(^3\) Official detailed document (in Spanish) for minimum curriculum for the secondary level
The current law also states the development of various skills related to the access to information, processing and use for communication, content creation, security and problem solving, both in formal and non-formal settings. The acquisition of these competences requires attitudes and values that allow users to adapt to the new developments established by technologies, appropriation and adaptation to one's own ends and the ability to interact socially within the technological sphere. It is developing an active, critical and realistic attitude towards technologies and technological means, assessing their strengths and weaknesses and respecting ethical principles in their use. Moreover, digital competences involve participation, collaborative work, motivation and curiosity for learning and improvement in the use of technologies. For an adequate development of digital competence, it is necessary to address the following areas:

- Information,
- Communication,
- Content creation,
- E-Safety,
- Problem solving.

See Infographic (in ES) about digital competence

3.6. Assessment of digital competence

The assessment of the students’ ICT competence is integrated in all subjects in a transversal way. Moreover, it is assessed in a more direct way in the separate optional subject ICT, offered at secondary education level.

4. DIGITAL LEARNING RESOURCES AND SERVICES

4.1. Digital content development

There were a number of authoring tools that have managed to build up a community of users supported by the educational authorities, the most relevant ones being JClic (mainly Primary School), Malted (English as a second language) Newton (Physics) and Descartes (Mathematics).

The latest tool whose use is being promoted by the MoE and several Autonomous Communities for the creation of new resources is eXeLearning. The original project of this tool was developed in New Zealand and it has lately been adapted and further developed by the Spanish MoE in collaboration with several Autonomous Communities and other organizations. eXeLearning is an Open Source authoring application that assists teachers and academics to create and publish educational content. Users of the tool are not required to be experts in HTML or XML. Resources authored in eXe include multimedia
materials, self-evaluation interactive activities, etc. that can be exported in IMS Content Package, SCORM 1.2, or IMS Common Cartridge formats or as simple self-contained web pages.

Furthermore, CeDeC aims at designing, promoting and developing digital educational materials through free software. It provides digital educational materials and resources (OER) that enable teachers and educators to deepen the implementation of ICT in Education.

4.2. Content sharing and creation

Procomún platform is a community of more than 27.600 teachers that share knowledge, experience, digital materials and resources, through different communities created, organized and managed by the very users of this platform. All the Autonomous Communities support this initiative with the aim to promote the use of the OER that are available on this platform. This national repository of contents federates content from repositories from each Autonomous Community, that also show an interest in integrating, optimizing and disseminating among teachers the variety of materials offered in different regional platforms (Educamadrid, Educantabria, Aularagón, LliureX, Educarm, Averroes, Educa, Medusa, Eskola 2.0, etc.)

4.3. Accessibility for learners with disabilities and social inclusion

Teachers can access learning resources for students with special needs through repositories administered by the MoE (Procomún) and the repositories of the Autonomous Communities (Fressa Project and ARASAAC). The MoE includes among its priorities the need to use ICT in order to adapt to the different abilities and conditions of each student, which means adapting learning to students with disabilities or special needs.

A close collaboration is established with CENTAC, the Centre for promoting development of accessibility technology within different environments.

See also section 4.2 Content Sharing.

4.4. Learning Platforms

Moodle
Moodle is widely used for online teacher training and a growing number of schools have adopted it for their own purposes. Most Autonomous Communities provide their teachers and schools with a virtual learning environment to upload and share resources with their students.
Virtual learning environments
Virtual learning environments are usually hosted in the servers of the educational administrations, not in the schools, and are often custom-made by software companies. They have been the most successful solutions for VLE since they are centrally administered and, this way, schools do not have to devote their own resources (people and devices) for their maintenance. Regional support is also given to the schools in order to have their own portal and intranet. In these cases, central servers host the school websites, which the school manages through a pre-installed content management system.

One of the objectives of the MoE through its *Plan de Cultura Digital en la Escuela* is to establish standards for the platforms used by different Autonomous Communities in the educational field. Hence, educational contents can be used in any VLE used by teachers in all the Communities. *See Section 2.1 National/ regional ICT policies.*

5. TEACHER EDUCATION FOR DIGITAL LEARNING

5.1. Assessment Schemes

There is no nationwide specific accreditation scheme for ICT teacher competence such as ECDL. Teachers are certified on a course basis according to the number of hours they have devoted. Courses need to be certified by the regional authorities in order to count for the teachers’ professional records and they are mainly taken online and outside of school hours. Teachers are required to take a minimum number of hours of training (100 to 250 hours depending on the Autonomous Community) every six years in order to obtain a salary raise. However, courses do not have to focus on ICT, but can be related to any aspect of education. Nevertheless, the offer of ICT courses (especially online), tends to outnumber the offer of non-ICT related courses.

Furthermore, one of the objectives the *Plan de Cultura Digital en la Escuela* of the MoE is to design and agree, with the Autonomous Communities, on a common model of development of teachers’ ICT competences for all dimensions and levels which would be valid both for initial and ongoing ICT training. As a result, a framework for Teacher Digital Competence has been designed, based on the DIGCOMP model developed by IPTS, and published in October 2017.

*See the Spanish framework of teacher Digital Competence: https://bit.ly/2IXHQtv

5.2. School leader support
School leaders are supported by the corresponding educational administration on which their school depends on. The support for ICT strategy may vary, from the support of district education officers to special regional programmes that favour the introduction of ICT in schools.

5.3. Digital technologies in initial teacher education

ICT is compulsory in initial teacher education. Primary teachers must take at least a one-semester subject covering ICT in Education. Secondary school teachers must take a specific Master in Secondary Education, part of which covers the integration of ICT in the teaching of their subject of expertise.

Initial teacher training tends to be a mixture of a theoretical and a hands-on approach that tries to enable future teachers to use ICT in their classrooms as well as to reflect upon and investigate them.

5.4. ICT in in-service teacher education

ICT in in-service teacher education is not compulsory. Nevertheless, there is a wide offer of ICT teacher training courses both at national and regional level which is positively welcomed by in-service teachers. Teachers sign up for those courses offered by educational authorities (online or face-to-face) according to their preferences and/or needs. See also 5.1 Assessment Schemes.

5.5. Training the Teacher Trainers

In-service training courses are mainly taught by expert teachers and occasionally by university lecturers. Initial training at universities is taught by lecturers in this area of expertise whose academic interests include the role of ICT in education.

The MoE and most Autonomous Communities offer courses (most of them online) to teachers to become tutors in teacher training courses. The online courses offered by the MoE are compulsory for the future tutors.

Studies on digital technologies in school education

ESSIE
