Kit@

MEDIA COMPETENCY TRAINING

FOR PROFESSIONALS IN DAY-CARE CENTERS & COMPARABLE INSTITUTIONS IN RURAL AREAS OF EUROPE

State of the Art on Media Education and Information and Communication Technologies (ICT) Use in Early Childhood Education
Intelectual Output 1, Part I
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Media competency training for professionals in day-care centres and comparable institutions in rural areas of Europe

State of art on media education as well as information and communication technologies (ICT) use in early childhood education

Intelectual Output 1, Part I

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LIST OF ABBREVIATIONS

Abbreviations	Meaning
APEEC	ASSESSMENT OF PRACTICES IN EARLY ELEMENTARY CLASSROOMS
BECTA	BRITISH EDUCATIONAL COMMUNICATIONS AND TECHNOLOGY AGENCY
CLASS	CLASSROOM ASSESSMENT SCORING SYSTEM
EC	EUROPEAN COMMISSION
ECE	EARLY CHILDHOOD EDUCATION
ECERS-R	EARLY CHILDHOOD ENVIRONMENT RATING SCALE
EECERA	EUROPEAN EARLY CHILDHOOD EDUCATION RESEARCH ASSOCIATION
EU	EUROPEAN UNION
ICT	INFORMATION AND COMMUNICATION TECHNOLOGIES
NAEYC	NATIONAL ASSOCIATION FOR THE EDUCATION OF YOUNG CHILDREN
NAMLE	NATIONAL ASSOCIATION FOR MEDIA LITERACY EDUCATION
OECD	ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
PD	PROFESSIONAL DEVELOPMENT
TPACK	TECHNOLOGICAL, PEDAGOGICAL, AND CONTENT KNOWLEDGE
UNESCO	UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANIZATION
UNICEF	UNITED NATIONS CHILDREN'S FUND

GLOSSARY

COMPULSORY EARLY CHILDHOOD EDUCATION – "obligation for children to attend ECE settings when they reach a certain age".

CONTINUING PROFESSIONAL DEVELOPMENT – "participation in formal and non-formal professional development activities, which may, for example, include subject-based and pedagogical training. In certain cases, these activities may lead to further qualifications" (European Commission/EACEA /Eurydice, 2015a, p. 14).

CURRICULUM – Set of pedagogic goals, values, and approaches which are expected to be achieved by the child, in a specific country and defined by political power - Ministry of Education-, on a given age group and/or educational level to reach their full potential in a holistic way and involving cognitive, social, emotional, physical, and language development (Litjens & Taguma, 2010).

DIGITAL OR TECHNOLOGY LITERACY – the ability to use digital technology, communication tools, or networks to locate, evaluate, use, and create information (UNESCO, 2011b).

EARLY CHILDHOOD EDUCATION (ECE) - covers all forms of organized and sustained centre-based activities – such as preschools, kindergartens, and day-care centres – designed to foster learning and emotional and social development in children. These programmes are generally offered to children between 3 years of age and the age of entry in primary education (OECD, 2013a).

ECE QUALIFICATIONS – "recognized level and types of knowledge, skills, and competencies that ECE staff have received" (OECD, 2012b, p. 1).

EDUCATIONAL GUIDELINES – Ideas, standards, or instructions on a certain subject that aim to improve the quality and educational opportunities of the child, usually suggested by socially valued entities in the field of education (e.g. associations, international organizations, universities, ministries) (European Commission/EACEA/Eurydice, 2015b).

GENERAL LEARNING SKILLS – General cognitive skills: attention (consciously directing concentration to a given task), memory (ability to acquire, store, and retrieve information), self-regulation (ability to control behaviours and thoughts to achieve a particular goal), executive function (cognitive skills necessary to control thoughts, emotions, and actions, such as self-control, working memory, cognitive flexibility), reasoning (organization of thoughts in a logical way to draw conclusions or ideas), problem solving (the process of finding solutions to difficult or complex issues) (Institute of Medicine National Research Council, 2015).

INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) – anything which allows us to obtain information, to communicate with each other, or to influence the environment, using electronic or digital equipment. In ECE, the term ICT can include computer hardware and software, digital and video cameras, the internet, telecommunication tools, programmable toys, and many other devices and resources (Misha & Joseph, 2012).

INFORMATION LITERACY – the ability to recognize when information is needed and to locate, evaluate, effectively use, and communicate information in its various formats (UNESCO, 2011b).

LEARNING SKILLS AND DISPOSITIONS – (approaches to learning) – initiative (individual action that begins a process), curiosity (quality related to inquisitive thinking), motivation (a reason or reasons for acting or behaving in a particular way), engagement (involvement in the learning environment), and persistence (ability to persevere with something) (Institute of Medicine National Research Council, 2015, p. 86).

MEDIA ACTIVITY – connects media knowledge and media evaluation, as self-determined and purposeful actions of people. Includes media adoption, media use, media participation, and media design (Schorb & Wagner, 2013). Is one of three main categories of media literacy according to Bernd Schorb.

MEDIA AUDIENCE – involves reaching audiences, defining audiences, audience use of media, audience interpretations and pleasures (Buckingham, 2014).

MEDIA EDUCATION – process of teaching and learning about media through which individuals become media literate – able to critically understand the nature, techniques, and impacts of media messages and productions (e.g. meanings and relevance) (Buckingham, 2003; National Association for Media Literacy Education, 2016).

MEDIA EVALUATION – critical ethically-based reflection on technical and textual media offers (Schorb & Wagner, 2013).One of three main categories of media literacy, according to Bernd Schorb.

MEDIA KNOWLEDGE – includes functional knowledge (e.g. knowledge about handling hardware and software or basic knowledge about media technology) and structural knowledge (e.g. understanding the networks in which the media are integrated or which are created by means of the media) (Schorb & Wagner, 2013).Is one of three main categories of media literacy, according to Bernd Schorb.

MEDIA LITERACY – consists of three main categories: media knowledge, media evaluation, and media action (Schorb, 2005) and includes a series of communication competencies: accessing, analysing, evaluating, creating, and acting using all forms of communication (NAMLE, 2016). According to Buckingham (2014), media literacy involves making meaning, elements of language, and combinations of elements, code, and conventions.

PARTICIPATORY CULTURE – culture which absorbs and responds to the explosion of new media technologies that make it possible for average consumers to archive, annotate, appropriate, and recirculate media content in powerful new ways (Jenkins, Clinton, & Purushotma, 2006).

STAFF – "those who work directly with children in the ECE field" (OECD, 2012c, p. 216).

STRUCTURAL QUALITY – consists of "inputs to process-characteristics which create the framework for the processes that children experience" (Institute of Medicine National Research Council, 2015, p. 86).

TRANSLITERACY – ability to use multiple literacies such as reading, writing, and interacting across a range of platforms, tools, and media from written representations of concepts to speech, through handwriting, printing, TV, radio and film, to digital networks and sharing information to create new meaning (Thomas et al., 2007).

TRANSMEDIA LITERACY – "set of capacities, practices, values, sensitivities and strategies of learning and exchange developed and applied in the context of new collaborative cultures" (Scolari, 2018, p. 4).

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EXECUTIVE SUMMARY

This report was developed within the Erasmus+ project *Kit@: Media competency training for professionals in day-care centres and comparable institutions in rural areas of Europe.* It aims to present a summary of the state of the art related to media education, and use of information and communication technologies (ICT) in early childhood education (ECE)[1], with children aged between 3 to 6 years, in Europe. It includes a description of ECE systems and practices related to media education and ICT use in ECE, as portrayed by Project partners from Bulgaria, Germany, Greece, Portugal, and Slovakia, in their country reports. Whenever possible, we focused on rural areas (across participating countries), considering the use of ICT and media education as pathways to reduce educational inequalities in isolated settings. Within the Kit@ project we have identified, described, and analysed: (a) the conceptual framework for ICT use and media education in ECE; (b) guidelines on ICT use and media education in ECE; (c) European research findings on media/ICT use in early childhood and ECE; (d) promising professional development approaches focusing on ICT use and media education in ECE; and (e) European opportunities and challenges associated with ICT use, media education of young children, and media competency of ECE professionals. The results emerging from these analyses are the basis for recommendations regarding media competency training of professionals in ECE settings and the development of educational practices for media and ICT use in ECE. The information presented here was obtained through a questionnaire specifically developed for this purpose and

[1] In this report, ECE refers to centre-based early childhood education settings for children between 3 years of age and the age of entry in primary education. However, country specificities may be considered.

answered by partners from the five countries participating in the Kit@ project, and through consultation of official international reports (e.g. OECD, EURYDICE, UNESCO) between January and July, 2018.

Part 1 – Conceptual framework regarding the use of ICT and media education in ECE

In part 1, we present a brief conceptual framework focusing on the importance of early childhood education as a basis for developing knowledge and abilities for media and ICT use, viewed as cornerstones for the 21st century. Also, we briefly discuss young children's developmental characteristics which should be considered when planning pedagogical activities.

Based on international recommendations (e.g. OECD, EURYDICE), the examination of ICT and media education should start during ECE, supported by a teacher, aiming to help children explore and understand these resources, which are accessible from an early age in their daily lives. We briefly describe recommendations by Buckingham (2000) and Livingstone (2002) regarding how media literacy and ICT use can be addressed with children between 3 and 6 years of age.

Part 2 – Guidelines on ICT use and media education in ECE

In part 2, we present international agency guidelines (e.g. UNESCO, EC, OECD, EECERA, NAYEC) on ICT use and media education in ECE, while also briefly discussing how measures of ECE quality address these topics. Further, we provide a summary of the education systems in Bulgaria, Germany, Greece, Portugal, and

Slovakia, including curricula/curriculum guidelines, teacher profiles, initial and continuous teaching training curricula and, if applicable, ethical considerations in the use of ICT and media.

Part 3 – European research findings on ICT and media use in early childhood and ECE

Part 3 presents European data regarding ICT use and media education for children aged 3 to 6 years, collected from partners in the project as well as from international reports and research databases using the keywords: "Information and Communication Technologies" or "media education" and "early childhood education". Specifically, we present data regarding type of accessible equipment, content areas, common types of activities and goals related to ICT and media, and activity structure (e.g. whole group, small group, or individual). Data regarding the use and preferences of children, the attitudes of teachers and parents toward ICT use and media education, family mediation strategies, and the role of children are also reported.

Part 4 – Professional development approaches focusing on ICT use and media education in ECE

Part 4 focuses on professional development and identifies relevant local, regional, national, and international initiatives, highlighting some European projects. We identify and present examples of best practices and available resources on ICT use and media education in ECE.

Part 5 – European opportunities and challenges associated with ICT use and media education in ECE

In Part 5, we analyse European opportunities and risks, associated with ICT use and media education in early childhood and ECE, and discuss the media competence of ECE professionals.

Part 6 – Recommendations for ICT use and media education in ECE

In Part 6, we present recommendations based on our analysis of the state-of-art tendencies regarding the use of ICT and media education in ECE. These include aspects that should be considered when planning, implementing, and evaluating pedagogical activities involving children between the ages of 3 and 6, both by ECE teachers and professionals, and by families and other educational agents (at the local, national, and international levels).

We acknowledge that some data collected by project partners may represent local but not national educational contexts.

GOALS AND CONTEXT

The main aim of this report is to present state-of-the-art media education and ICT use in ECE settings serving children between 3 years and the age of entry in primary education in Europe. This description of the state-of-art media education will inform the creation of innovative solutions for the development of media pedagogical competences using ICT and the acquisition of digital skills by professionals in ECE settings, especially in rural regions, to reduce social exclusion.

This report includes:

- Definitions of key concepts associated with media education and ICT use in ECE;
- A brief overview of children´s development between the ages of 3 and 6 years;
- A brief overview of the main guidelines proposed by international agencies on ICT use and media education;
- A brief description of quality measures in ECE that encompass ICT use;
- A brief description of the educational systems of the five countries involved in the KIT@ project, including guidelines and relevant indicators on ICT use and media education (e.g. curriculum guidelines, pre-service teacher training curricula, teacher profiles, ethical guidelines);
- A brief description of research findings on media education and ICT use in European ECE settings and within families of preschool-aged children;
- A brief presentation of promising professional development approaches focusing on ICT use and media education in ECE;

- Analyses of opportunities and risks associated with ICT use and media education of young European children and ECE professionals;
- Recommendations regarding educational practices associated with ICT and media use by young European children and professionals in ECE.

This report focuses on media education and ICT use among children between 3 and 6 years of age and ECE professionals in the European context. Furthermore, whenever possible or relevant, it focuses on data or examples from the five European countries - Bulgaria, Germany, Greece, Portugal, and Slovakia – actively involved in the Kit@ project - *Media competency training for professionals in day-care centres and comparable institutions in rural areas of Europe*, aiming to maximize international cooperation for the search for innovative and quality practices for the media and for the use of ICT in ECE.

PART 1 - CONCEPTUAL FRAMEWORK ON ICT USE AND MEDIA EDUCATION IN ECE

In this section, we present a conceptual framework focusing on the importance of early childhood education as a basis for developing knowledge and abilities for media and ICT use, viewed as cornerstones for the 21st century. Also, we briefly present some developmental characteristics of young children which should be considered when planning pedagogical activities. Based on international recommendations (e.g. OECD, EURYDICE), the examination of ICT and media education should start during the preschool period and be supported by a teacher, helping children explore and understand these resources. Based on Buckingham (2000) and Livingstone (2002), we describe recommendations on how media literacy can be developed in children between 3 and 6 years of age.

Young children are surrounded by screens and exposed to digital media (Chaudron, Di Gioia, & Gemo, 2018; Beutel, Černikova & al., 2015; McPake, Plowman, & Stephen, 2013; Ponte, Simões, Batista, Jorge, & Castro, 2017). From an early age, children are in contact with various screens (e.g. tablet, personal computer, smartphone) and with various types of media (e.g. radio, television) that allow them quick access to information (e.g. internet content). Consequently, from an early age, children need to develop competencies such as access to and use of digital technology or media literacy (Sefton-Green, Marsh, Erstad, & Flewitt, 2016). It is important to understand that

media presents a constructed reality, considering aspects such as audience and purpose (Buckingham, 2014; Pereira, Pinto, Madureira, Pombo, & Guedes, 2014). These contacts with media and the Internet play an important role in the development of children (European Commission, 2007).

Although the importance of education for the media and the use of ICT has already been socially recognized, it is only in the last five years that international organizations (European Commission, 2013; OECD, 2013a) have highlighted the importance of media education and the use of ICT for the development of young children between the ages of 3 and 6 years. However, it is important to understand that there are inequalities in access to digital technologies (e.g. socioeconomic status, age) (Livingstone, Mascheroni, & Staksrud, 2015). "Many children do not have sufficient resources to use the Internet to explore their opportunities or to develop vital digital literacy skills" (Livingstone, Haddon, & Gorzig, 2012, p. 11).

Benefits and risks regarding digital media are socially recognized in Europe.

Education for the media is necessary for children to learn to communicate using the different means at their disposal. Addressing media issues involves learning and understanding the concepts and realities associated with, for example, the role of media messages, including underlying ideology and values.

Contact with media and the internet plays an important role in the development of children (European Commission, 2007).

Access to ICT and media in ECE can improve children's lives and provide additional resources that can be used by teachers in planning, implementing, documenting, monitoring, and evaluating activities, children's learning, and their teaching-learning process. It also makes it possible to attenuate inequalities, particularly in contexts with limited access to information and resources, as is the case of rural areas, and to promote communication between the school and the family (e.g. imagined contact and extended contact, Turner & Cameron, 2016; computer-mediated contact, White & Abu-Rayya, 2012).

The importance of providing high-quality ECE has been recognized by several international agencies (e.g. EU, OECD, UNESCO) and researchers (Vandenbroeck, Lenaertsb, & Beblavý, 2018) due to the recognition of its long-term impact on children's lives. Improving the quality of ECE requires, among other things, raising the social value of the purpose of this level of education and the inclusion of socio-culturally and economically diverse children and families. In this sense, media education can assume particular relevance, especially in rural contexts, because the lack of specialized staff and resources exacerbates disadvantages (OECD, 2017a; Sun, Rao, & Pearson, 2015). The use of ICT and media may allow children to be advantaged in disadvantaged environments (e.g. rural areas) and should therefore be considered at the centre of

design and implementation decisions in education (OECD, 2016c, 2017c; Venezky & Davis, 2002).

The use of ICT and media may allow children to be advantaged in disadvantaged environments.

The benefits of children's use of these social resources are recognized (e.g. Belle, 2016). However, changes in teacher practices have been slow and are often associated with a recognition of the need for more training and more resources in the ECE context (e.g. Plumb & Kautz, 2015). Children learn to "read" the world around them and the information they come in contact with through child-friendly and supportive family environments and also through ECE professionals who provide pedagogical activities of "reflection" on the media, appropriate to their developmental skills. However, it is well documented that the use of digital technology may not bring about improved learning outcomes, as much depends on the pedagogy adopted (Fisher, 2006; Watson, 2001).

Changes in teacher practices have been slow and often associated with recognition of the need for more training and more resources in the ECE context.

What are the key concepts related to ICT use and media education in ECE?

Digital media literacies imply operationalization of their use (competence of use), recognition of the cultural and critical dimensions that encompass personal motivations, analysis of the veracity of the media message, and also understanding the representation made available by digital means (Buckingham, 2013; Castro, Ponte, Jorge, & Batista, 2017; Sefton-Green et al., 2016). The effective use of ICT and media in ECE involves a child and teacher-centred learning approach, higher-order thinking skills, operational skills, social media skills, and the promotion of responsible internet use (DG Communications Networks, 2013).

Relationship between media concepts

Below, we present a scheme that seeks to represent the relationship between various media-related concepts (Figure 1).

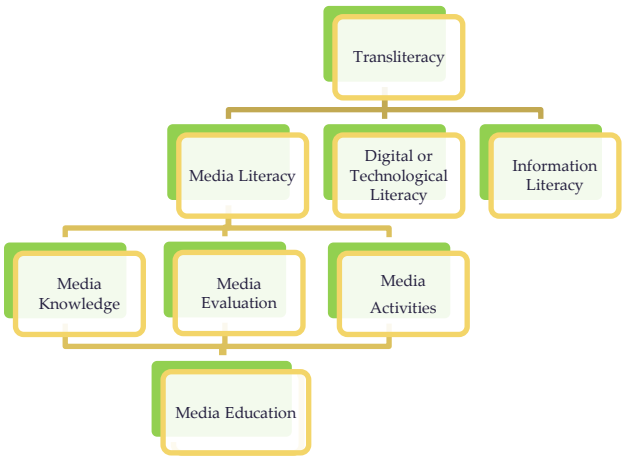


Figure 1 – Representation of relations among media-related concepts.

There are multiple concepts related to literacy involving media and digital resources. Therefore, several authors (e.g. Jenkins, 2008; Thomas et al., 2007) present the concept of transliteracy as the "hat" which includes the set of multiliteracies that involve reading, writing, and communicating through various resources. Although the concept has undergone changes over time (Ciastellardi & Di Rosario, 2015; Frau-Meiqs, 2012), it involves critical and reflected use of different channels and multiple forms of languages to better understand and create. Thus, transliteracy involves media literacy, digital literacy, and information literacy. To acquire media communication skills in different formats in an intentional, critical, and reflected way, it is necessary to promote forms of media education that involve and depend on media knowledge, media activities, and media evaluation. The skills of usage, knowledge, and evaluation of the media will make the user media literate.

Media literacy

According to Oliveira and Caetano (2017), the Resolution on Media Literacy in the Digital World, published by the European Parliament in 2008, specifies that *media literacy* should include: (a) competent and creative use of media and its contents; (b) critical analysis of media products; (c) an understanding of the functioning of the media industry; and (d) the independent production of media content. Pérez-Tornero and Tayie (2012) also analysed modules for media literacy training and defended that these must address three essential aspects: (1) knowledge and understanding of media and information; (2) evaluation of media texts and sources of information; and (3) production and use of media and information. Relatedly, Lee (2016) argues that the

average literate person should have the following competences: critical awareness of media influence on individuals and society; understanding of the nature and operation of the media industry; media analytical skills; critical appreciation of media; learning through media; creative expression; media monitoring and media criticism; media ethics; and constructive application to everyday life.

Also, Schorb (2005)[2] argued that *media literacy* implies and depends on media knowledge, media activities, and media evaluation. It allows citizens to access, have a critical understanding of media, and interact with them (Expert Group on Media Literacy, n/d). It describes the knowledge, skills, and competences required to develop, with autonomy and awareness, in the new communicative environment - digital, global, and multimedia, and it is considered the result of the process of media education (Tornero & Manuel, 2007).

Media literacy implies and depends on media knowledge, media activities, and media evaluation (Schorb. 2005).

Media literacy involves the ability to communicate with all communication media using multimodal language (e.g. the printed word and graphics, sound, as well as the moving image) through any form of technology and to understand the importance of this type of social communication.

[2] Translated from German into English by Eva-Maria Aurenz.

According to the European Charter of Media Literacy, there are seven areas of competences (or uses) related to media literacy in particular:

1. The effective use of media technologies to access, store, retrieve, and share content to meet individual and community needs and interests;
2. Gain access to and make informed choices about a wide range of media forms and content from diverse cultural and institutional sources;
3. Understand how and why media content is produced;
4. Critically analyse the techniques, languages, and conventions used in media, and the messages they convey;
5. Use media creatively to express and communicate ideas, information, and opinions;
6. Identify and avoid or challenge media content and services that may be offensive or harmful; and
7. Make effective use of media in the exercise of democratic rights and civil responsibilities.

These aspects should be considered in the implementation of educational activities for media and ICT use in ECE, which should be used on a regular basis and involve all educational agents actively, allowing for the participatory development and management of the activities in ECE.

In general, media literacy refers to the knowledge, skills, and competencies that, with autonomy and awareness, allow for critical engagement with the mass media and digital technologies to go beyond use and interpretation of media, to incorporate a

broader analytical understanding (Buckingham, 2000). The development of media skills by children and ECE professionals involves: information regarding the process of generating and providing information through media, the use of techniques, and the production of media resources (Abreu, Mihailidis, Lee, Melki, & McDougall, 2017).

The development of media skills by children and ECE professionals involves: information regarding the process of generating and providing information through media, the use of techniques, and the production of media resources (Abreu et al., 2017).

UNESCO defines media education as “a fundamental right of each and every citizen of any country in the world to freedom of expression and the right to information, and is considered the tool for building and maintaining democracy". In general terms, and according to UNESCO and OECD, media literacy is achieved through media education in formal and informal contexts and by interaction with the media, family education, and learning ethics and values. The development of these competences will allow children to become active and participatory citizens capable of expressing themselves freely and to develop a democratic spirit capable of supporting intercultural dialogue.

Media literacy is achieved through media education in formal and informal contexts and by interaction with the media, family education, and learning ethics and values.

Both concepts, Media education and Media literacy, have been described and defined in the international context by UNESCO in an initiative that began in 1982 with the conference in Grunwald (1982), aiming for the systematic understanding of the formal strategies and conventions of communication from the textual analysis (reading and writing) to the analysis of electronic and digital media which occurs in the advanced stages of the development of an information society. Media literacy, like literary education, is a complex process that involves time, practice, and cognitive maturity. Therefore, the development of educational activities for the media in ECE will depend on the age of children and their development (e.g. children between the ages of 3 and 5 may find it difficult to distinguish reality from fiction or to understand that sometimes situations observed on the internet and on television are not real).

The development of educational activities for the media in ECE depends on the age of children and their development.

Therefore, media literacy is intended to facilitate understanding, supported and guided by the adult, as an integral part of the texture of children's daily lives (Buckingham & Burn, 2007). The understanding of the role of the media by children depends in part on their social experiences of using media and on the purpose and meaning attributed by them to those experiences.

It is known that children increasingly have access to information, not only on television but also through any technological device with internet access. For this reason, media education is becoming more important in the process of teacher training (Gabinete de Comunicación, European Association for Viewers' Interests (EAVI), The Centre de liaison de l'enseignement et des médias d'information (CLEMI), & Université catholique de Louvain à Louvain (UCL), 2009; UNESCO, 2006; Wilson, Grizzle, Tuazon, Akyempong, & Cheung, 2013).

According to Sefton-Green et al. (2016), the process of education for digital media literacy with children implies the development of critical, operational, and cultural dimensions (see Figure 2).

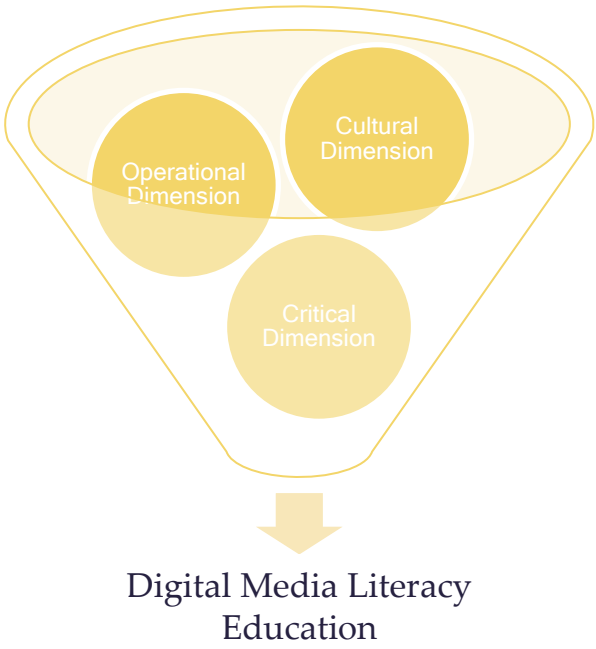


Figure 2 – The operational, cultural, and critical dimensions of digital media literacy, according to Sefton-Green et al. (2016).

According to these authors, digital media literacy education involves: (a) an operational dimension where children use "skills and competences required to read, write and make meaning in diverse media, utilising a range of modes"; (b) a cultural dimension related to children's "understandings and practices derived from engaging in digital literacy practices in specific social and cultural contexts"; and (c) a critical dimension related to children's "ability to engage critically with digital texts and artefacts, interrogating issues such as power and agency, representation and voice, authenticity and veracity". Therefore, teachers should promote activities that integrate information regarding the world around the child, considering its cultural impact based on how information is interpreted (e.g. clothing, religion, and food in different countries).

Digital media literacy education involves operational, cultural, and critical dimensions.

Also, according to these authors, planning activities to promote digital literacy education with young children requires: developing digital media, stimulating the production of digital media content, and disseminating content to the educational community, including digital and media use. This process should always involve children (micro context), family, friends, peers, and the community inserted in the formal and informal contexts of learning (meso context), and also the society (macro context).

Media education

Media education is the process through which individuals become media literate, that is, able to critically understand the nature, techniques, and impacts of media messages and productions.

Media education is the process through which individuals become media literate.

According to Buckingham (2014), media education involves: (a) choosing and understanding concepts; (b) practice through mediation, construction, regulation, and change of representations; (c) implementing the media production process and understanding influencing aspects (e.g. media company power); and (d) audience understanding (e.g. audience media uses, preferences, audience interpretations). These aspects are represented in Figure 3.

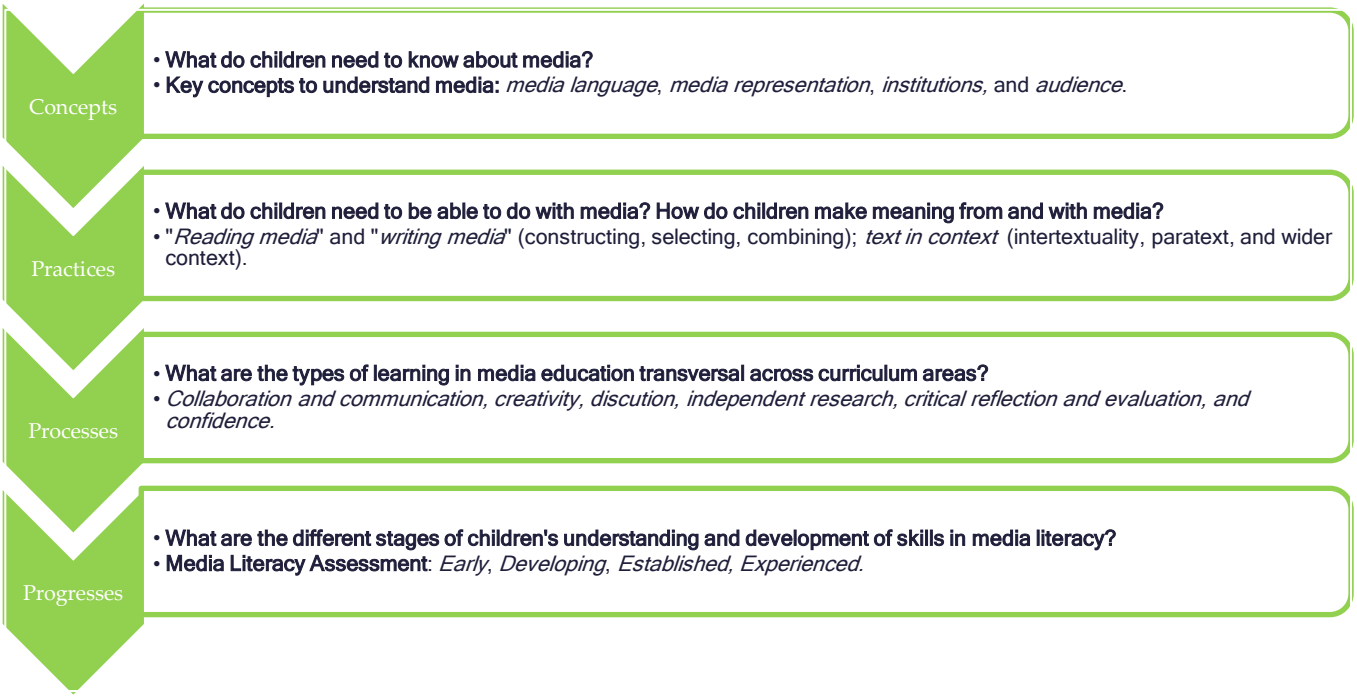


Figure 3 - Representation of education for the media, based on Buckingham (2014).

According to the European Commission Directive 2007/65/EC of the European Parliament and of the Council of 11 December 2007, Media Education:

> "aims at the skills, knowledge and understanding that enable consumers to use the media effectively and safely. Media-educated people are able to make informed choices, grasp the nature of content and services, and take advantage

> of the full range of opportunities offered by new communications technologies. They are better able to protect themselves and to protect their families against harmful or harassing material" (European Commission, 2007, p. 23).

Media education involves human behaviour and action that translates into innovative communication processes within society. Education for the media should be more than experienced handling of technology and screens, including children producing and understanding media, mobilizing skills such as critical reflection or understanding of media systems. It is expected that these resources benefit democracy, with citizens assuming themselves as producers and consumers of information. Education for the media also allows children to learn progressively, and with the help of adults, to become more active citizens, with freedom of expression and the right to information. It is, therefore, instrumental in building and sustaining democracy (UNESCO, 2006). Thus, the participants of the conference "Educating for the Media and the Digital Age" recommended that Media education, which is a multi-contextual process involving the acquisition of attitudes, values, and specific abilities and competences in Multiliteracies, should be introduced whenever possible within each national curricula as well as in tertiary, non-formal, and lifelong education (Cope & Kalantzis, 2000).

Other authors, such as Buckingham (2014) and Sefton-Green et al. (2016) have also reflected how they can operationalize the development of media literacy skills acquired through media education.

What are the media education skills of the 21st century that teachers should consider in their pedagogical practices?

The use of ICT and media has undergone rapid transformations, with increasing access to information and opportunities for collaboration and individual contributions. These transformations have increased the complexity of the role of teachers, who should promote the development of various competences, such as critical thinking skills, initiative, self-direction to manage goals and time, social and cross-cultural skills to interact with others, productivity and accountability to manage projects, leadership, and responsibility to guide and lead others (Partnership for 21st Century Skills 2009).

ICT and media transformations have increased the complexity of the role of teachers.

Professional engagement of competent professionals capable of exploring the diverse competences needed for the 21st century, in a transversal way (Paniagua & Istance, 2018b), is necessary. Competent professionals are able to find solutions to new problems, taking into account the context of educational innovation, where teachers must have creative skills and technical mastery in order to enhance the process of media education with children (Paniagua & Istance, 2018b). Teachers also need to promote active learning that supports children's self-control, working memory, and cognitive flexibility (Paniagua & Istance, 2018a). In this sense, the 21st century skills

framework intends to prepare children for a more complex life and work environment. To achieve these goals, a few authors (e.g. Ferrés & Piscitelli, 2012;) have suggested the use of a model that explains the two dimensions that should be observed and evaluated by teachers across education levels regarding the "participatory culture" (Jenkins, 2006) that involves media skills and skills needed to analyse situations of interaction with media and ICT:

Dimension of Analysis:

- Analysis and interpretation of message content and objectives;
- Knowledge of the universe of media and media production systems;
- Analysis of information sources;
- Critical search for information;
- Cultural and semiotic skills;
- Analysis of virtual identities and internet risks;
- Knowledge of the audience and of media consumption;
- Ability to interpret messages from many cultures;
- Knowledge of social networks and underlying rules;
- Knowledge of online public services;
- Knowledge about media regulation and regulatory authorities;
- Advanced skills and critical thinking.

Dimension of Expression:

- Computer and digital skills;
- Experimentation for or and creativity;

- User-created content;
- Appropriation and transformation of contents;
- Ability to evaluate relevant media content to share publicly;
- Ability to develop and modify content, questioning the values and stereotypes intrinsic to media products;
- Selection, sharing, and comparison of information from social networks;
- Creation of and contribution to collaborative networks;
- Balanced management of the real and virtual identity;
- Use of media to transmit values and contribute to social and cultural responsibility;
- Selecting information relevant to public discussion;
- Using government-provided electronic services.

Two dimensions should be observed and evaluated by educators across education levels: analysis and expression.

ECE professionals seek to equip children with skills and respond to rapid social and technological changes (Paniagua & Istance, 2018b). Considering the individual characteristics of children, promoting self-regulation of learning, and attending to adaptation needs are suggestions presented by Corno (2008) to promote adaptive teaching.

What are the skills involved in media literacy?

Media literacy skills include creativity, flexible thinking, intercultural dialogue, media use, participation, and intervention. These should be explored in ECE work related to the following areas, according to Dig.Com.2.0:

- Information and data literacy through action guides;
- Communication and collaboration;
- Digital content;
- Safety;
- Problem-solving (Vuorikari et al., 2016).

Media literacy skills include creativity, flexible thinking, intercultural dialogue, media use, participation, and intervention.

Available research suggests the best results of current educational models derive from experimentation, action-oriented learning with teachers, and collaborative practice communities (Looi, Lim, & Chen, 2008). The promotion of activity co-construction through technology-enhanced learning activities is an excellent example of how ICT can enrich the learning process and become integrated in planning and evaluation of ECE professionals' pedagogical practices (Cviko, McKenney, & Voogt, 2014).

According to Jenkins' (2006), new media literacy skills involve:

Play - the capacity to experiment with one's surroundings as a form of problem-solving.

Performance – the ability to adopt alternative identities for improvisation and discovery.

Simulation - the ability to interpret and construct dynamic models of real-world processes.

Appropriation – the ability to meaningfully sample and remix media content.

Multitasking – the ability to scan one's environment and shift focus as needed.

Distributed cognition – the ability to interact meaningfully with tools that expand mental capacities.

Collective intelligence – the ability to pool knowledge and compare notes with others toward a common goal.

Judgment – the ability to evaluate the reliability and credibility of different information sources.

Transmedia navigation - the ability to follow the flow of stories and information across multiple modalities.

Networking – the ability to search for, synthesize, and disseminate information.

Negotiation – the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms.

Visualization – the ability to interpret and create data representations to express ideas, find patterns, and identify trends.

The introduction of ICT and media can facilitate assessment processes (self-assessment, peer assessment, and teacher assessment) by stimulating the participatory management of children, families, teachers, and the educational community in defining the issues that need to be addressed in ECE. Thus, it can result in a process of quality assessment that addresses content, context, objectives, and necessary changes (reflection-action), attending to the characteristics and previous knowledge of children, ICT use in learning, ICT resources, the home environment, and the use of ICT by teachers. Through ICT, practitioners can participate in communities that compile examples of good practice, discuss the teaching process, and enhance their practice through, for example, project development (OECD, 2016b, 2018).

Stimulating participatory management of children, families, teachers, and the educational community to define the issues that need to be addressed in ECE.

How can teachers develop media education with children, families, and educational teams?

Currently, there are policies to encourage media education (Buckingham, 2007; Selwyn, 2010), namely making available specific documentation outlining frameworks for curriculum development and practice in this area (e.g. introductory guide to media education) and professional training for teachers and other practitioners. ICT and media resources are accessible to children and add value to learning by stimulating the creation of authentic tasks, creativity, and the use of play, while allowing for immediate feedback. Media education means engaging with students' everyday experience of digital media, rather than using it opportunistically as part of another form of subject learning (Buckingham, 2007). However, some aspects to bear in mind regarding the use of ICT and media in ECE, are: (a) children's experience with ICT and media at home (e.g. knowledge and skills); (b) children's previous learning experiences and environments (e.g. culture or social interactions); (c) children's perceptions, behaviour, and learning with ICT and media (e.g. dispositions, feelings).

ECE digital media literacy activities should add value to learning by stimulating the creation of authentic tasks, creativity, and the use of play, while allowing for immediate feedback.

It is therefore necessary to develop critical media literacy that involves the understanding of concepts such as the social construction of the message, the dissemination of the message (e.g. linguistic, semiotic), the audience, the politics of representation and diffusion of the message, and the social impact of the message (especially in favour of the groups represented) (Share, Douglas, & Funk, 2016). Media also plays an increasingly important role in society, by allowing for the consumption and production of messages that can quickly spread socially and by influencing the way messages are interpreted socially.

The use of media in ECE intends to achieve pedagogical and sociocultural goals. One relevant role of parents and teachers is to mediate the use of technologies and resources to protect and prevent negative effects on children (Mascheroni & Cuman, 2014).

It is necessary to develop critical media literacy that involves the understanding of concepts such as the social construction of the message, the dissemination of the message, the audience, the politicy of representation, diffusion of the message, and the social impact of the message.

What are the developmental outcomes expected from ECE?

ECE aims to promote (1) *Physical development*, through the stimulation of motor skills, coordination, speed, and balance; (2) *Language skills*, through the development of vocabulary, the stimulation of children's use of language through conversation and questioning about the child's reality, and the promotion of verbal interaction with adults; (3) *Critical thinking*, through reflection activities on the questions posed by children that lead them to understand how the world around them works and why certain phenomena or situations occur; (4) *Play*, through the organization of time, spaces, and materials that allow children to explore songs, stories, and representations (e.g. drawings, theatres plays) that develop creativity and imagination; (5) *Social skills and emotional development*, through playing games and interacting with others (e.g. children and adults), sharing toys or play space, etc.

According to the National Association for the Education of Young Children (NAYEC), students require 16 skills for the 21st century, which include: *Foundational Literacies*, related to how the children use the skills of the curriculum in their daily lives (Literacy, Numeracy, and Scientific literacy, ICT literacy, Financial literacy, and Cultural and civic literacy); *Competencies*, which encompass how children approach complex problems based on critical thinking/problem-solving, communication and collaboration; and *Character Qualities*, related to the way children approach their changing environment through curiosity, initiative, persistence, adaptability to new situations, leadership, and social and cultural awareness across lifelong learning.

How does the development of children influence the planning of ICT use and media education activities in ECE?

Developing activities with children requires an understanding of their developmental level in cognitive, social and emotional, motor, and language terms. Typical constraints related to age and level of development should be considered when designing quality activities (Bandura, 1997; Erikson, 1993; Erikson & Erikson, 1998; O´Conner, De Feyter, Carr, Luo, & Romm, 2017; Piaget, 1951, 1973; Vygotsky, 1978). Thus, **some relevant characteristics of children in the age range of 3 to 6 years, with pedagogical implications**, include the following:

- They are in the pre-operational stage (according to Piaget's constructivist learning theory), and therefore logical operations involving reasoning processes can be difficult.
- They are learning the relationship between symbols and reality.
- They are in a phase of egocentrism, which is the reason why they have difficulty in "putting themselves in the place of others".
- They present animism or the belief that inanimate objects may have animated features (e.g. feelings, thoughts).
- They present some difficulties in distinguishing between fiction and reality, especially between 3 and 5 years.
- They are learning self-control.
- They present some difficulties in perception and can be fooled by appearances.
- They tend to focus on specific and visible aspects (e.g. colour, size, shape).

- They present transductive reasoning, which means they focus on concrete examples and may not be able to induce or deduce information.
- They focus on states rather than transformations.

Therefore, given the inherent developmental constraints of young children, **planning and implementing pedagogical activities in ECE settings** should consider the following:

- Teachers should promote sensory-motor exploration based on concrete materials to help children develop an understanding of the relationship between objects and the associated vocabulary and to develop mental representations.
- The process of reflection on a subject or theme should be divided into small steps and guided by the adult.
- Teachers should create concrete and observable situations.
- Teachers should assist children in reflecting on and anticipating consequences (e.g. use dialogue and group reflection).
- Teachers should carry out activities that distinguish between fiction and reality, for example, by using children's stories or ideas as a means of deconstructing aspects impossible to observe in real life (e.g. people travelling a magical flying carpet), promoting reflection and gradual and oriented learning through make-believe or dramatic play. For example, role-playing related to the Little Red Riding Hood story, exploring the actions of each character in order to "experience" the events and to reflect on the feelings associated with the adult

and the children (How do you think Little Red Riding Hood felt when she discovered that it was the wolf that was in that bed?) (Pereira et al., 2014).

- Teachers should establish relationships between what existed in the past and what exists in the present, what children feel and the purpose of these experiences, and promote children's understanding of their identity and the development of empathy.
- Teachers should promote activities with a practical purpose that respect children's knowledge of the environment that surrounds them (e.g. talk about visible and familiar objects).
- Teachers should use different forms of communication (e.g. sounds and gestures).
- Teachers should stimulate the understanding of cause and effect relationships and the classification of elements by encouraging verbalization by children and recording action-consequence relationships.
- Teachers should assist discovery by guiding and supporting the child's findings through, for example, explanations, demonstrations, and verbal expositions.
- Teachers should use collaborative work with peers, teachers, and, if possible, families.
- Make-believe or dramatic play can foster a child's social development by exploring different roles and, thus, increase understanding of the surrounding context.
- Teachers should encourage the use of different forms of communication (e.g. words, gestures).

- Teachers should promote children's control and power over the environment and give children a sense of purpose.
- Teachers should establish clear rules for performing tasks.
- Teachers should explore questions related to socialization and sex-role development with the children, starting from the reality of each child.
- The environment must be structured to promote children's confidence and engagement in new situations (e.g. concrete and observable situations) and should also promote deep engagement in age-appropriate activities.
- Teachers should promote focused attention on specific aspects during activities and avoid multiple stimuli simultaneously.
- Teachers should promote the observation, recording, and comparison of transformations.
- Teachers should build on and encourage curiosity and support children in dealing with failure.
- Teachers should present similarities and differences (e.g. cultural, social) and explain them.

Brief overview of key concepts on children and adults´ learning

Adult and child learning processes present common elements that must be considered when developing professional development (PD) activities. Such activities should include a clear definition of objectives; plan actions that are explicit, structured, diversified, oriented, and reflected; respect and integrate different learning styles (e.g.

verbal, visual, auditory/musical, physical/kinaesthetic, logical/mathematical), emotions (e.g. motivation), physical, psychological, and relational states (e.g. previous learning experience, need to know and readiness, self-concept) (e.g. Malcolm Knowles Andragogy Model). Thus, in the process of organizing adult learning, it will be important to include supportive leaders, develop a culture of continuous improvement, and the use of an intuitive knowledge process and a clear learning structure.

Learning in children occurs naturally by observing their surroundings while learning in adults is more planned. The development of ECE activities should involve the intentionality of adults and the potential for spontaneity and interests of children.

PART 2 – GUIDELINES ON ICT USE AND MEDIA EDUCATION IN ECE

In this section, we present international agency guidelines (e.g. EC, EECERA, NAYEC, OECD, UNESCO) on ICT use and media education in ECE and discuss how quality measures used in ECE address these topics.

ICT is appearing more and more frequently in society, both in and out of school and shaping present and future education by increasing the use of digital resources. Today, it is a ubiquitous presence in society, that is, it is accessible almost everywhere and at any time (Kilpatrick, Saulsburry, Dostal, Wolbers, & Graham, 2014). Technology is seen as a necessary component of life, such as oxygen (Selywn, Potter, & Cranmer, 2010).

The use of digital media tools in ECE does not necessarily mean that teachers are innovating their practices and much less automatically means that it improves the quality of teaching. These resources should be contextualized and aimed at specific objectives that explore not only learning with ICT per se, but also the development of more effective learning (Sancho & Hernández, 2006). According to Jonassen (2007), it is necessary to reflect on how to improve and optimize the use of ICT in teaching and learning by listening to the voices of learners and practitioners.

Different countries of the European Union are using ICT and media education in diverse ways. Entities such as the OECD, the European Union, the UN, or UNESCO

acknowledge the importance of ICT and media education in ECE, and have recommended that policy decisions be made to promote National Educational or Curriculum Guidelines for Early Childhood Education that address these issues. They also recognize that ICT matters in ECE, because it influences people and the environments that surround young children's learning and well-being. There is strong consensus in the literature that it is timely for the role and potential of ICT for the ECE sector to be critically examined, to guide future developments and decision-making in this area. In most cases, the use of technologies is considered a cross-disciplinary learning area involving a variety of methodologies that may include project-based, inquiry-based, or game-based learning.

International agency guidelines

International agencies recognize the importance of providing high-quality ECE to promote the global and healthy development of children. Several entities recognise the importance of working together with policymakers (international and national) and the local educational community (e.g. children, families, and ECE professionals) to achieve high quality and increase opportunities. In particular, the European Union has recognized the responsibilities of governments and international entities in improving the quality of ECE and enhancing children's outcomes. An example of this concern in Europe is the goal of raising ECE attendance up to 95% of children by the year 2020. According to recommendations by the OECD and UNESCO, it is important to provide guidelines on ICT use and media education in ECE since it is an area of learning that cannot be missed or ignored in the lives of children (OCDE, 2018; 2012b,2015,2016b; UNESCO, 2006, 2010, 2011b).

International agencies recognize the importance of providing high-quality ECE to promote the global and healthy development of children.

ICT access and infrastructure in European ECE settings have increased in recent years, although not as much as in other levels of education (O'Hara, 2004; Sheridan & Samuelsson, 2003). Researchers and national and international agencies support the development and integration of ICT into education policies, curricula, and practices. There are more and more guidelines which provide information about ICT use in early childhood aiming to support ECE practitioners in making well-informed decisions and choices about ICT and media (Downes, Arthur, & Beecher, 2001; NAEYC, 2012; Siraj-Blatchford & Whitebread, 2003). However, while ICT is used by teachers and children, the purposes of these investments have not always been considered in planning pedagogical activities in ECE.

Research suggests that the use of ICT and media can reduce inequalities and serve as an integration tool, stimulating participation and respect for diversity. Relatedly, ECE professionals need to make education for the media and ICT available to all children. The OECD has highlighted the need for funding to train qualified staff to support children's cognitive, social, and emotional development (OECD, 2012a). However, the use of ICTs in teaching and learning is still limited, although media literacy related skills are considered important 21st century's competences (OECD, 2013b).

The use of ICTs in teaching and learning is still limited (OECD, 2013b).

Most evidence focusing on the use of ICT and media in ECE is based on case studies. However, findings show positive aspects of the use of these resources, in a thoughtful and oriented way, in the development of children, promoting their involvement and interest, providing immediate reinforcement, and developing linguistic, motor, and digital skills (OECD, 2010). ICT can help eliminate boundaries between oral and written language and allow for the visualization of mathematical concepts and relationships. ICT computer-facilitated activities can have positive impacts on play and learning (UNESCO, 2010).

Approaches to ICT use and media education in ECE quality measurements

Quality teaching has been recognized by the United Nations as one of the 17 goals necessary for sustainable global development. It consists of a goal that aims to ensure inclusive and quality education for all and promote lifelong learning. However, quality in education is not a universal concept and it is inseparable from the context in which the education process is taking place. The assessment of educational quality in ECE is essential to achieve the objectives defined by the countries of the European Union. In general, ECE aims to develop skills in children by supporting their cognitive,

socioemotional, motor, and language development, but it also aims to support the child and the family in the transition between the family and the educational context and between levels of education.

Quality teaching has been recognized by the United Nations as one of the 17 goals necessary for sustainable global development.

It is known that high-quality ECE fosters the development of competencies in children and improves children's outcomes (European Commission /EACEA/Eurydice/Eurostat, 2014; European Commission, 2018a). It can also mitigate unfavourable conditions for the child's development. However, the definition of high-quality in ECE is not unanimous and has attracted the attention of international agencies, researchers, and ECE professionals.

High-quality ECE fosters the development of competencies in children and improves children's outcomes.

Research has shown that educational agents and learning environments influence the quality of teaching and curriculum in an indirect way (European Commission/EACEA/Eurydice/Eurostat, 2014; European Commission, 2018b; OECD,

2017g). Also, socioecological and developmental theories highlight the importance of the bidirectional relationship between children and the educational environment that shape their development.

Assessing educational quality requires assessing the actions of professionals and of the entire educational community to verify and monitor whether the planned and implemented activities can help reach the established objectives and to evaluate their impact on children's and families' daily life.

The OECD and the European Commission (European Commission /EACEA/Eurydice/Eurostat, 2014) have defined the Key Principles of the Quality Framework for Early Childhood Education and Care, which should be considered in the evaluation of educational quality in ECE, and address accessibility, workforce, curriculum, monitoring and evaluation processes, and the importance of governance and funding. Further, according to this proposal, professionals must consider the following: (1) clarify the goals (i.e. everyone involved knows what is expected to achieve at the end of the activity); (2) provide frequent conversation as well as analysis and reasoning opportunities; (3) prompt throughout the process (e.g. request that children explain their thinking); (4) provide a positive and encouraging environment (with quality interactions between children, parents, and professionals); and (5) stimulate active partnerships. The evaluation of quality practices in ECE presupposes the analysis of structural, process, and outcome quality (Keulen & Mutant, 2016).

Principles of the Quality Framework for Early Childhood Education and Care address accessibility, workforce, curriculum, monitoring and evaluation processes, and the importance of governance and funding.

The National Association for the Education of Young Children (2009), outside the European context, has also defined guidelines for practitioners that include the following dimensions: sensitive and responsive caregiving; intentional teaching; using a curriculum for instruction; monitoring children's progress and differentiating instruction; and establishing reciprocal relationships with families.

Currently, quality measurement tools such as the Early Childhood Environment Rating Scale – Revised (ECERS-R) (Harms, Clifford, & Cryer, 1998) are used as observational measures to describe and assess the characteristics of ECE settings. The ECERS-R includes one item related to television, video, and/or computer uses (Harms et al., 1998). The indicators of quality on this topic include assessing if these resources are available; the criteria used for their selection; when activities with the computer, video, or television are used and how often; and the length of time these resources are used (Harms et al., 1998). It also considers if the materials used are (un)suitable for the child's development (e.g. violent or sexually explicit content, characters, or storylines; inappropriate level of difficulty of computer games) and if alternative activities to

using a computer or tablet are allowed (Harms et al., 1998). High-quality ICT environments require the use of appealing, age-appropriate, non-violent, and culturally sensitive materials which are relevant to children's daily life and promote an understanding of the world (e.g. videos for preparation of study visits); provision of alternative activities; and regulation of time spent by children using such devices (Harms et al., 1998). Further, it requires that activities and materials promote children's active involvement (e.g. software which stimulates thinking and decision-making) and creativity (e.g. drawings or creative paintings, solving problems through games), and the involvement of ECE staff in order to promote and assist children in the use of these resources (Harms et al., 1998).

High-quality ICT environments require appealing, age-appropriate, non-violent, and culturally sensitive materials which are relevant to children's daily life and promote an understanding of the world; provision of alternative activities; and regulation of the time spent by children using such devices (Harms et al., 1998).

In the Assessment of Practices in Early Elementary Classrooms (APEEC), the quality of computer use is described on the basis of existence and availability of resources, the duration of the activity, and the type of activities developed (e.g. research activities) (Hemmeter, Maxwell, & Ault, 2001).

The Classroom Assessment Scoring System (CLASS) (Pianta, LaParo, & Hamre, 2008) measures ECE environments based on three domains of teacher-child interactions: emotional support, classroom organization, and instructional support. According to Pianta et al. (2008), in planning and implementing educational activities, it is important to ensure clarity of learning objectives; to promote analysis and reasoning; to involve a variety of modalities; to consider children's interests; and to ensure connections to the real world, among other practices (Keulen & Mutant, 2016; Park & Vandekerckhove, 2016).

Qualified staff is a key factor in ensuring ECE quality. Leadership skills, staff working to support less qualified staff, and staff with a good understanding of child development and learning are central (Siraj-Blatchford, 2010). In the context of ICT use, the Technological, Pedagogical, and Content Knowledge (TPACK) model has highlighted the importance of articulating pedagogical knowledge, technological knowledge, and content knowledge to create new knowledge that is more complex and integrated (Mishra & Koehler, 2006).

According to UNESCO (2010), facilitators of the integration and use of ICT in education include collaboration, pedagogical objectives, and the individual characteristics of students. Equally important is the use of digital and non-digital resources in the educational context since the exploration of different contexts of action and interaction is beneficial to understanding the possibilities and potentials of each context in view of the intended objectives.

Therefore, we propose the design and implementation of integrative activities that result from the integration of pedagogical knowledge regarding practices in ECE, technological knowledge that enhances learning for this age group (3 to 6 years), and knowledge related to education for the media and the use of ICT by teachers and children in ECE in a transversal way, aligned with the curriculum guidelines of each country.

For the implementation of pedagogical activities that use ICT and media, the use of the cognitive goals (remembering, understanding, applying, analysing, evaluating, and creating), processes, and sub-processes defined in Bloom's taxonomy (see Anderson & Krathwohl, 2001) is suggested. The use of multiple means of representation, the use of strategies of action and expression, and the involvement of children are essential elements in the teaching-learning processes, especially those involving ICT resources (see CAST, 2011; Meyer, Rose, & Gordon, 2014).

For the implementation of pedagogical activities that use ICT and media we propose the use of the cognitive goals, processes and sub-processes defined in Bloom's taxonomy.

In the European context, great attention has been paid to the evaluation of digital competences in teaching-learning processes, resulting in the creation of a *Digital*

Competence Framework for Educators[3]. This framework proposes three key areas that must be considered in the context of digital competences: (1) *Educators' professional competences*; (2) *Educators' pedagogic competences*; and (3) *Learners' competences* (Lucas & Moreira, 2017; Vuorikari et al., 2016). Educators' professional competences include aspects related to professional engagement (organizational communication, professional collaboration, reflective practice, and professional development of digital competences). Educators' pedagogic competences include dimensions related to: (a) digital resources (selecting, creating and modifying, managing, protecting, sharing); (b) teaching and learning (teaching, collaborative learning, and self-regulated learning); (c) assessment (assessment strategies; analysing evidence; feedback and planning); and (d) empowering learners (accessibility and inclusion; differentiation and personalization; actively engaging learners). Learners' competences include facilitating learners' digital competencies (information and media literacy, communication, content creation, reasonable use, and problem solving) (Lucas & Moreira, 2017; Vuorikari et al., 2016).

[3] In the context of this report, the term educators can be replaced by teachers.

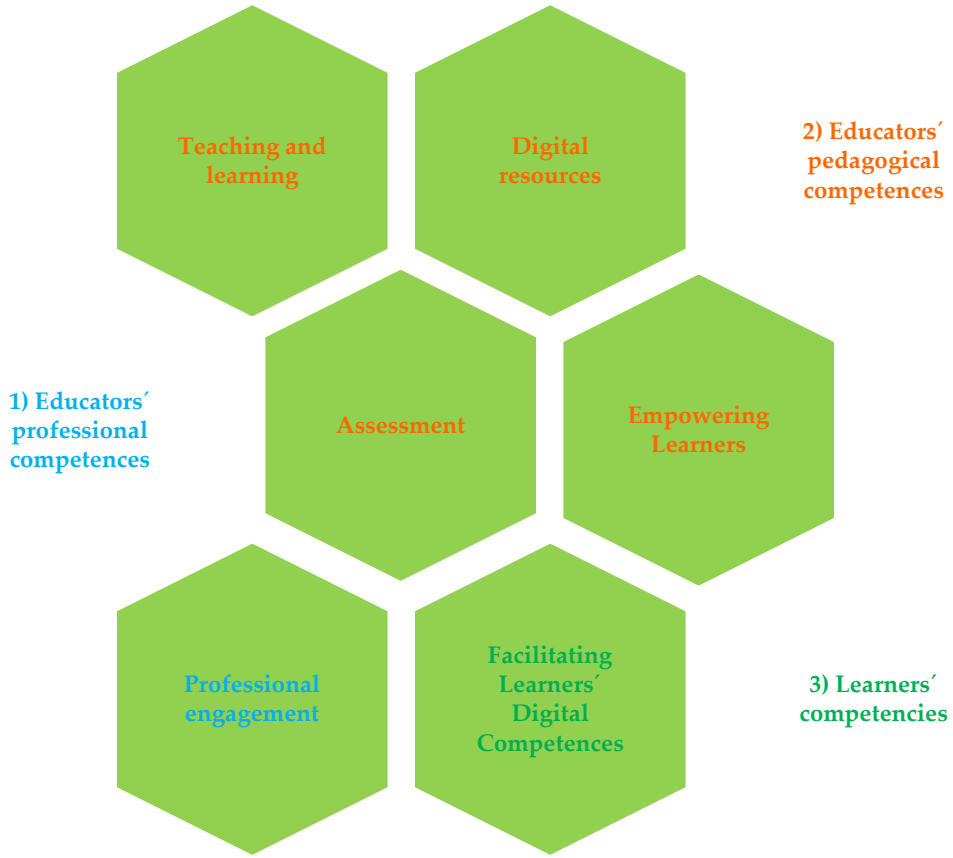


Figure 4 – Representation of the Digital Competences Framework for Educators.

In the European context, great attention has been paid to the evaluation of digital competences in teaching-learning processes, resulting in the creation of a Digital Competence Framework for Educators.

In turn, some authors have provided guidance for building technologically-rich learning environments (Shapiro, Østergaard, & Roccaro, 2016) and for creating levels

of analysis of media education experiences (**nuclear** - media education represents a central concern or objective, alone or in articulation with other objectives; **instrumental** – indirect or instrumental initiatives in media education where media is not the central focus; or **approximate** - including initiatives and actions with potential for media education, but in which it appears implicitly or, more often, distant) (Pinto, Pereira, Pereira, & Ferreira, 2011). Also, Buckingham (2014) presented a scale of media literacy assessment that included four concepts: *Languages* (elements of language, combinations of elements, codes, and conventions); *Representation* (messages and values; audience; interpretations); *Institutions* (production practices; ownership and power; media economics; regulation); and *Audience* (reaching audiences, defining audiences, audiences' uses of media, audience interpretations and pleasures) and four levels for each concept: (1) *Early*, (2) *Developing*, (3) *Established*, and (4) *Experienced*. According to this author, the more concepts are rated at a higher level, the higher is the average literacy of the person assessed, according to his/her actions, reactions, and understanding of concepts related to the media.

Features of the ECE systems in Bulgaria, Germany, Greece, Portugal, and Slovakia

A summary of ECE systems in the five European countries that participate in the Kit@ project is presented here, including curricula guidelines, teacher profiles, initial and continuous teacher training curricula, and ethical considerations in the use of ICT and media. In order to characterize ECE systems and contexts in the five European countries involved in the Kit@ project (i.e. Bulgaria, Germany, Greece, Portugal, and Slovakia), documents from international agencies were used, including European

Commission (European Commission/EACEA/Eurydice, 2016a; Commission European/EACEA/Eurydice/Eurostat, 2014), EUROSTAT (e.g. EUROSTAT, 2017), and Eurydice reports (e.g. Commission/EACEA/Eurydice, 2017). Further, we consulted national partners through a questionnaire on ICT use and media education in ECE. In some countries, limited data were available on ICT use and media education in ECE (e.g. Slovakia, Bulgaria).

The definition of ISCED Level 0 from UNESCO (2012) was used to collect information from international reports: "Early childhood education provides learning and educational activities with a holistic approach to support children's early cognitive, physical, social and emotional development and introduce young children to organized instruction outside of the family context to develop some of the skills needed for academic readiness and to prepare them for entry into primary education" (UNESCO, 2011a).

In this section, we aim to describe how ICT and media education are addressed in national ECE curricula/curriculum guidelines (i.e. recommended teacher practices, experiences to be provided, skills targeted). One of the reasons for this, among others, is that "the importance of Media Education in schools stems from the fact that children and young people are becoming more and more intensely identified as consumers and producers of media. They must therefore be equipped with the knowledge and skills for a well-informed consumption and understanding" (Pereira et al., 2014, p.5). We will consider international guidelines, especially in the European context, which tend

to highlight the importance of a cross-disciplinary approach to educational fields (European Commission/EACEA/Eurydice, 2016).

> *"The importance of Media Education in schools stems from the fact that children and young people are becoming more and more intensely identified as consumers and producers of media. They must therefore be equipped with the knowledge and skills for a well-informed consumption and understanding"*

In Bulgaria, Germany, Greece, Portugal, and Slovakia there are curriculum guidelines that guide ECE. The definition of curriculum guidelines in ECE allows the structuring of children's experiences. The different educational agents in each country must assume the role of co-constructors of the curriculum, creating partnerships between teachers, parents, children, and communities to achieve ECE objectives (Burchinal, 2018; OECD, 2017f). In Portugal, for example, this document helps professionals by providing them with access to goals, content, and a means for effective implementation through the use of examples (OECD, 2012b).

> *The different educational agents must assume the role of co-constructors of the curriculum, creating partnerships between teachers, parents, children, and communities to achieve ECE objectives.*

An overview of ISCED Level 0 in the five participating countries is presented below. As seen in Table 1, in almost all countries, ECE provision includes 3 years, except for Greece, which has a shorter duration, and Bulgaria, with a longer duration (OECD, 2012a, 2017a). Also, in most countries, the Ministry of Education is responsible for ECE, except in Germany, where the responsibility for the education system is shared between the 16 federal subdivisions of Germany (federal states) and the federal government (European Commission/EACEA/Eurydice, 2017). Free ECE provision varies between 20 and 40 hours per week across countries (European Commission/EACEA/Eurydice/Eurostat, 2014). In most countries involved (Bulgaria, Greece, Portugal, and Slovakia), the percentage of children enrolled in public ECE institutions is higher than in private institutions (OECD, 2017d). Also, Greece and Slovakia show percentages of children enrolled in public institutions above the OECD average (OECD, 2017f).

Table 1 - Overview of ISCED Level 0 in the five participating countries.

	Bulgaria	Germany	Greece	Portugal	Slovakia	OECD average
General ECE system						
Usual starting age in ECE[4]	3	3	4	3	3	-
Number of years in ECE [4]	4	3	1 to 2	3	3	-
Starting age of compulsory education [4]	7	6	5	6	6	-
Under the Ministry of Education[4]	Yes	No	Yes	Yes	Yes	-
Free ECE provision (hours/age)[5]	20h (≤ 5y) 24h(6y)	28h	22.5h (4-5y)	25h (3-6y)	40h (5-6y)	-
Participation rate for children between 4 and the age of compulsory education (2015) (EUROSTAT, 2018)	86.5	97.4	79.6	93.6	78.4	-
Percentage of children enrolled in public and private ECE institutions (2015) (OECD, 2017b)						
% children enrolled in public institutions	98	35	92	53	95	67
% children enrolled in private institutions	2[6]	65	8	47	5	33
Expenditure on ECE (ISCED 0) as a percentage of GDP (2013) in public and private institutions (OECD, 2016a, 2017f)						
ECE for infants and toddlers (0-2 years)	*	0.3	*	0.0	0.0	0.2
ECEC (3-5/6 years)	0.9[7]	0.6	*	0.6	0.5	0.6
Annual expenditure per student for all services in ECE, in equivalent USD converted (2011)[8]						
Annual USD expenditure	*	8.35	*	5.67	4.65	7.43

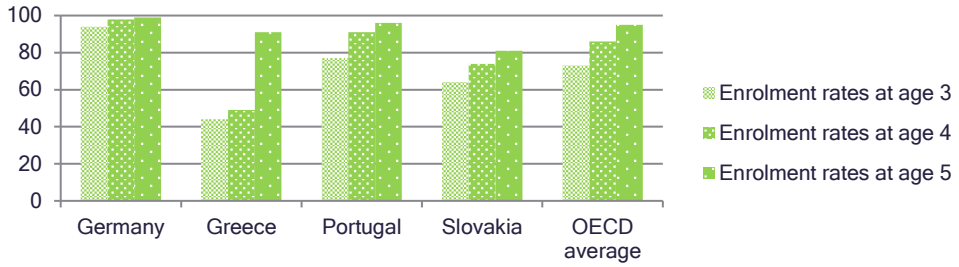
Note: *Some data are not available in these sources.

Slovakia spends less per student in ECE, as a percentage of GDP (2013), than the OECD average while Germany and Portugal spending per student is equivalent to the OECD average (European Commission/EACEA/Eurydice/Eurostat, 2014). Bulgaria also

[4] **Sources:** European Commission/EACEA/Eurydice (2017); Eurostat (2018); Eurydice (2012, 2013); OECD (2012a, 2017f); UNESCO (n/d).
[5] **Sources:** European Commission/EACEA/Eurydice/Eurostat (2014).
[6] **Source:** Republic of Bulgaria National Statistical Institute (2017).
[7] **Sources:** https://www.oecd.org/els/soc/PF3_1_Public_spending_on_childcare_and_early_education.pdf (2013); Republic of Bulgaria National Statistical Institute (2015), GDP for Bulgaria for 2014 is 82,164 Billion Bulgarian leva (BGN).
[8] **Source:** European Commission/EACEA/Eurydice/Eurostat (2014a).

seems to spend more per student in ECE than the OECD average; however, it is important to note that the data collected on this country are relative to 2017, when Europe was devoting more attention to ECE. According to data related to expenditure per student for all services in ECE, Germany spent more than the OECD average, while Portugal and Slovakia spent less per student in ECE than the OECD average.

Regarding participation rates in ECE in 2014, as seen in Figure 5, almost all countries have already guaranteed universal or quasi-universal access to at least one year of ECE, with 90% of children or more attending ECE in one age group, which represents considerable progress towards reaching the Sustainable Development Goals education targets (see United Nations, 2016). All countries are following the trend of the OECD by showing an increase of access to ECE. In this respect, Slovakia is the only participating country that has not yet achieved this goal. However, when considering the participation rates in ECE in 2005 and 2010 (OECD, 2012a), there is a steady increase in children's access to ECE in this country too.



Note: Participation rates in ECE in Bulgaria (2014) were not available. However, for the year 2016, in Bulgaria, the percentage of children aged 4-6, enrolled in ECE was 86.5%[9] and the percentage of children aged 3-6 was 79.4%[10].

Figure 5 - Participation rates in ECE between 3 and 5 years age, in 2014 (OECD, 2016a, 2017d).

There is considerable variation across countries in pre-service teacher-training requirements in public institutions, conditions of entry into pre-service training (e.g. with or without competitive examination), duration of training (between 3-5 years), and level of education required for teaching in ECE classrooms (see Table 2).

[9] **Source:** http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_uoe_enra10&lang=en.

[10] **Source:** http://www.nsi.bg/en/content/4802/group-net-enrolment-rate-children-kindergartens-statistical-zones-statistical-regions.

Table 2 - Pre-service teacher-training requirements in public institutions (2010), (OECD, 2012a).

Country	Competitive examination required to enter pre-service teacher training	Duration of teacher-training programmes (years)	Teaching practice required as part of pre-service training	ISCED type of final qualification	Percentage of teachers with this type of qualification
Bulgaria	Yes	4	Yes	5A	*
Germany	No[11]	3/5	Yes[8]	5B	*
Greece	Yes	4	Yes	5A	97%
Portugal	No	5	Yes	5A**	100%
Slovakia	*	*	*	5B***	*

Note: 5A (Tertiary-type A programmes) - are largely theory-based and are designed to provide qualifications for entry into advanced research programmes and professions with high knowledge and skill requirements; 5B (Tertiary-type B programmes) - are classified at the same level of competence as tertiary-type A programmes but are more occupationally oriented and usually lead directly to the labour market. *Data are not available. ** Since 2008, the qualification required for Portuguese teachers working in ECE is a master's degree, as a result of the implementation of the Bologna process in higher education. *** The law in Slovakia requires only secondary pedagogical education for teachers in ECE, according to Zákon č. 317/2009 Z. z. o pedagogických zamestnancoch a odborných zamestnancoch a o zmene a doplnení niektorých zákonov. However, most teachers of the young generation move on to Bachelor and then Master degrees.

[11] **Source:** Federal Ministry for Family Affairs (2004, p. 92): http://www.oecd.org/education/school/34411165.pdf.

ECE SYSTEMS SUMMARY

1. All five education systems provide at least 2 years of ECE;
2. In most countries, ECE for children aged 3-5/6 years is under the responsibility of the Ministry of Education;
3. Participation rates in ECE are above the OECD average in two countries (Germany and Portugal), and follow the trend of the OECD to increase access to ECE;
4. In Bulgaria, Greece, Portugal, and Slovakia, the percentage of children enrolled in public ECE institutions is higher than the percentage of children enrolled in private institutions;
5. In some countries, ECE can also be provided by government-dependent private institutions or/and independent private institutions;
6. The percentage of overall spending in ECE varies considerably among countries: Germany and Portugal have percentages of overall spending in ECE similar to the OECD average; Slovakia has a percentage of overall spending in ECE below the OECD average; and Bulgaria has a percentage of overall spending in ECE above the OECD average;
7. Most countries involved in Kit@ tend to spend less per child in all ECE institutions than the OECD average;
8. The minimum qualification required for teachers to work in ECE is secondary education (Slovakia and Germany) or equal to or higher than Bachelor's degree in a university (Bulgaria, Greece, and Portugal).
9. There are differences in pre-service teacher-training requirements between countries.

ICT and media education in ECE

According to data collected from country reports about ICT and media education in ECE in Bulgaria, Germany, Greece, Portugal, and Slovakia, all five countries have national Education Curricula/Curriculum Guidelines for ECE, defined in collaboration with or by the Ministry of Education (Bulgaria - Regulatory Act No. 5 from 03.06.2016

by the Minister of Education and Science; Greece - Ministerial Decision 21072β/Γ2/28-2-2003; Portugal – Curriculum Guidelines for Preschool Education (Silva et al., 2016); Slovakia - Ministry of Education). In Germany, each federal state has its own curriculum; however, "The Framework Agreements of The Conference of The Ministers of Education and Resolutions of The Youth and Family Ministers Conference" provides a nationwide reference framework.

These countries also defined similar main pedagogical objectives for ECE: promotion of the integral development of children, facilitation of children's transitions between contexts (e.g. family and school) and levels of education (i.e. ECE and primary education), promotion of school-family interaction, as well as reduction of any disadvantage of the child or family (e.g. economic, place of residence, language, special educational needs). In all countries, the promotion of inclusion is also one goal of ECE. In general terms, ECE intends to support children and families in their development and to assist the country's economy by supporting the employability of parents.

In general, ECE curricula are based on an in-centre or school-based approach, with qualified professionals (usually with a master's degree), who seek to promote children´s education and development (e.g. language, motor, and social competences). There is also a set of foundation skills that encompass, among other areas, early literacy, numeracy, science, and artistic skills.

Table 3 - Characteristics of the Educational Curriculum Guidelines for ECE in Bulgaria, Germany, Greece, Portugal, and Slovakia.

Country	Number of central educational fields for ECE	Educational fields with topics on ICT and media	Suggestion frtransversality of ICT use
Bulgaria	8	"Construction-technical and craftsmanship skills"	No
Germany	7	"Communication, language or aesthetics"	Depends on the federal state
Greece	5	"Creation & Expression and Information Technology"	Yes
Portugal	3	"Knowledge of the World"	Yes
Slovakia	7	"Mathematics and work with information"	No

The number of central educational fields for ECE ranges from 3 to 8 content areas (see Table 3). In all countries, educational fields focusing on ICT and media are integrated within another pedagogical area, linked to communication, information, and/or expression (Germany, Greece, Portugal), mathematics (Slovakia) or construction and craftsmanship area (Bulgaria). As for references in the curriculum regarding ICT or media use, there is a variety of situations: in Portugal and Greece there are suggestions for using ICT and media in an integrated way, stimulating the use of ICT and media as a means of developing skills in other areas; in Bulgaria and Slovakia there are no such indications. In turn, in Germany there are variations as a function of federal states. Media are sometimes listed as an independent educational area or assigned to another area directly or indirectly (e.g. language and communication, aesthetics, etc.) (Eder & Roboom, 2016; Neuß, 2016). It should be noted that even in countries where

the transversality of ICT and media use is not suggested, there are specific centres and teachers that use an integrative ICT and media approach.

In most countries involved in the Kit@ project, the use of ICT and media education is crosscutting, and explicitly defined in the curriculum (Bulgaria, Germany, Greece[12], and Portugal), except in Slovakia where students learn to use ICT with standalone content areas (e.g. powering on and off computers; typing on the keyboard).

Only in Germany, in some federal states, is there a clear curricular reference to early promotion of media literacy in ECE, although in some countries there is recognition by the Ministry of Education of the importance of media education (Bulgaria, Germany, and Portugal), contrary to other countries (Greece and Slovakia). In Portugal, and in some Lander of Germany, there are ICT and media use guidelines for ECE (e.g. Pereira et al., 2014). However, only in Germany there is an explicit expectation for ECE teachers to use media education, as defended by Friedrich and Meister (2015): "in the educational plans of the federal states, which form the basis for the pedagogical work of day care centres and partly of the primary schools, the expectation of educators to take the media sector into account in their pedagogical work is explicitly formulated" (p. 3).

[12]**Sources:** https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Greece:Early_Childhood_Education_and_Care; https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Greece:Early_Childhood_Education_and_Care; http://dschool.edu.gr/; 'The Use of PCs in Pre-primary Education – Interviews' (Vasileios Oikonomides – Nikolaos zaranis), www.pi.schools.gr/programmes/depps and Ministerial Decision 21072β/Γ2/28-2-2003.

In all countries, curriculum guidelines mention the use of digital media. However, only Germany, in some federal states, indicates there is information regarding media didactic use in ECE. In all countries, curriculum guidelines mention the use of ICT by children and ICT is used by teachers for administrative, planning, and documentation purposes.

ECE SYSTEMS, ICT, AND MEDIA EDUCATION SUMMARY

1. There are policies and educational guidelines for ECE in all participating countries.
2. Countries present similar pedagogical objectives for ECE.
3. In all countries, inclusion and developmental outcomes (e.g. communication, critical thinking) are ECE's objectives.
4. In general terms, ECE aims to support children and families in their development and to assist the country's economy (supporting the employability of parents).
5. In general, ECE curricula include a centre or school-based approach, with qualified professionals.
6. In all countries, there is a pedagogical area where the use of ICT and media education is referred to directly or indirectly in the ECE curriculum, associated with communication, information and/or expression (Germany, Greece and Portugal) mathematics (Slovakia) or construction and craftsmanship area (Bulgaria).
7. In Portugal and Greece, there are suggestions for using ICT in an integrated way, stimulating the use of ICT as a means of developing skills in other areas, while in Bulgaria and Slovakia there are no such indications. In Germany, there are Lander variations.
8. ICT and media education are crosscutting areas is most countries (i.e. Bulgaria, Germany, Greece, and Portugal), except in Slovakia where ICT seems to stand alone.
9. In some German Landers, there is a clear curriculum reference to early promotion of media literacy in ECE. In Bulgaria, Germany, and Portugal, there is recognition by the Ministry of Education of the importance of media education.
10. In Portugal and in some Landers of Germany, there are ICT and Media guidelines for ECE.
11. Only in Germany there is an explicit expectation for ECE teachers to provide media education, in some federal states.
12. All countries mentioned that children in ECE use ICT, and in most countries, ICT is also used by teachers for administrative, planning, and documentation purposes (except Slovakia).

ICT use and media education in ECE teacher profiles

Next, we present data on general and specific professional profiles of ECE teachers/educators, which provide a basis for the development and certification of initial training programmes, with a special focus on the five countries involved in this project.

The social context is a fast-changing world, creating new challenges and opportunities in education that require teachers to innovate their practices. However, only one in every four teachers in Europe have high-digital literacy (DG Communications Networks, 2013). Therefore, it is necessary to provide teachers with opportunities to develop their digital skills and to promote innovative learning that integrates digital and analogue devices. Available data suggest teachers across all five countries (Bulgaria, Germany[13], Greece[14], Portugal, and Slovakia) recognize the need for training in the field of ICT and media education. In some of these countries, such as Bulgaria, there is a dedicated programme by the Ministry of Education and Science, to promote ICT among preschool and school institutions. International institutions have also devoted more attention to the importance of training and professional development as a prime need for teachers, promoting the funding of actions and resources for teachers that stimulate a systematic process of assessment, feedback, and measurement of outcomes (European Commission, 2007).

[13] **Source:** Lauffer and Röllecker (2016).
[14] **Sources:** https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Greece:Early_Childhood_Education_and_Care http://dschool.edu.gr/; "The Use of PCs in Pre-primary Education – Interviews" (Vasileios Oikonomides – Nikolaos zaranis).

Increasing awareness of the potential of ICT and media can enable ECE practitioners to take advantage of the communicative and pedagogical advantages and be prepared to avoid undesirable uses (e.g. online bullying) or to control the effects of associated disadvantages (Balanskat, Blamire, & Kefala, 2006; BECTA, 2007).

The competences of ECE professionals are fundamental to the promotion of high-quality education. To this effect, it is crucial to find quality indicators for teacher training (Davies, 2010). The OECD (2005) recognized that educational systems should invest in the training of qualified teachers to improve the quality of their practices. Well-trained professionals are considered the key factor in providing high-quality ECE and achieve the most favourable cognitive and social outcomes for children (OECD, 2006). Raising staff qualifications and providing training will improve the quality of teaching and results obtained regarding child development (Elliott, 2006; Sheridan et al., 2009).

Literature about new media in ECE settings, and studies of early childhood teachers and teachers-in-training learning to use ICT suggests that effective professional development supports teachers in developing an understanding of new media that connects with their existing ECE philosophy and pedagogical views. Effective media education and professional development incorporates teachers' own aspirations, skills, knowledge, and understanding into the learning context. It provides opportunities for teachers to learn and explore new ways of working in their own ECE settings, stimulates practitioners to reflect on their views and ideas about children's

learning and development, and to analyse and question how things are done in ECE. Effective professional development emphasizes collaborative knowledge-building, and practitioners sharing their situated learning experiences with new media. It provides support networks to help practitioners be active researchers in their own ECE settings, and to access current research and expertise in new media.

Likewise, ICT and media related training approaches targeting ECE professionals should integrate multiple knowledge such as pedagogical, content, and technological knowledge. However, more research is needed on how to engage staff in learning about and implementing evidence-based practices using ICT and media education (Diamond & Powell, 2011).

In the Digital Competence Educational Framework, the European Union proposes that the training of digitally competent teachers include:

1. Technological Dimension

- Technology fluency (digital tools for the learning process; communication and management; monitoring and recording data).
- Technological commitment (solving technical problems and transferring technological knowledge).
- Digital responsibility (protecting devices, data, and privacy; respecting copyrights and licenses, and protecting health and well-being).

2. Educational Resources

- Finding, evaluating, and sharing digital resources (searching, finding, and organizing; assessing credibility, usefulness, suitability; sharing and publishing).
- Creating and adapting digital content.

3. Pedagogical Dimension

- Embedding digital technologies (managing digital tools in the learning process and enhancing teaching and learning strategies).
- Innovating pedagogic strategies (collaborative, authentic, and self-directed learning).
- Assessment (peer assessment and self-reflection; effectiveness and diversity; and rewarding learners´ use of digital tools).

4. Facilitating learners´ digital competences

- Facilitating learners' digital fluency (information skills; content creation; communication and collaboration; and technical and problem-solving skills).
- Facilitating learners' digital citizenship (online safety; responsible and ethical use; health and well-being; copyrights and plagiarism).

5. Professional engagement

- Communication and collaboration.
- Continuous professional development (enhancing digital competence and online opportunities).

- Developing a vision for innovation (innovating educational and organizational practice).

References to the use of ICT and / or media education in the profile of ECE teachers vary across countries. Next, we present some data collected from the five participating European Union countries.

Table 4 - References to the use of ICT and/or media education in the profile of ECE teachers in Bulgaria, Germany, Greece, Portugal, and Slovakia.

Country	Are there professional profiles of ECE teachers?	Are there references to the use of ICT and/or media education in the profile of ECE teachers?	References to the use of ICT and/or media education
Bulgaria	Yes	No	-
Germany	Yes	Yes	Media literacy (media knowledge, media criticism, media usage and media design) refers to the ability to use media and their content according to their own goals and needs.[15]
Greece	Yes[16]	No[17]	-
Portugal	Yes[18]	Yes	Use of technologies (tool and management of the learning environment)[19]
Slovakia	Yes	No	-

[15]**Source:** Kultusministerkonferenz (2017).
[16]**Source:** Provisions of Law 4009/2011.
[17]**Source:** Interviews with nursery and kindergarten teachers conducted in person by Educational Dynamics (February-March 2018); https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Greece:Early_Childhood_Education_and_Care.
[18]**Sources:** Law no. 240/2001, 30th August and Law no. 241/2001, 30th August and https://eacea.ec.europa.eu/national-policies/eurydice/content/initial-education-teachers-working-early-childhood-and-school-education-59_en.
[19] **Sources:** Law no. 240/2001, 30th August and Law no. 241/2001, 30th August.

Data collected indicated that Bulgaria[20], Germany[21], Greece, Portugal[22], and Slovakia have specific professional profiles for ECE teachers (see Table 4). Only in Germany[23] and Portugal[24] there are references to the use of ICT and/or media education in the profile of ECE teachers. In Germany, there are references to Media literacy (media knowledge, media criticism, media usage, and media design) and, in Portugal the profile mentions the use of technologies (as a tool and for the management of the educational environment).

The qualification level required for ECE teachers in these countries varies between: Vocational school degree (Germany and Slovakia) and Higher education degree (Bulgaria, Portugal, and Greece). Some countries have laws regulating teacher training in higher education institutions (Bulgaria[25], Greece, and Portugal[26]). In Germany[27], each federal state has its own laws and regulations.

[20] **Sources:** Regulatory Act № 12 from 01.09.2016 for the statute of teachers, directors and other pedagogical experts by the Minister of Education and Science.
[21] **Sources:** December 2011, the Standing Conference of the Ministers of Education and Cultural Affairs (Kultusministerkonferenz – KMK) developed a competence-based qualification.
[22] **Sources:** Law No. 240/2001, 30th August; Law no. 241/2001, 30th August.
[23] **Sources:** December 2011, the Standing Conference of the Ministers of Education and Cultural Affairs (Kultusministerkonferenz – KMK) developed a competence-based qualification profile for all fields of work of pedagogic staff in early childhood education and care in training in a Fachschule.
[24] **Sources:** Law No. 240/2001, 30th August and Law no. 241/2001, 30th August.
[25] **Source:** Regulatory Act on the State Requirements for acquisition of professional teacher qualification № 289 from 7.11.2016 by Ministerial Council.
[26] **Sources:** Decree-Law 43/2007 of 22th February, https://eacea.ec.europa.eu/national-policies/eurydice/content/initial-education-teachers-working-early-childhood-and-school-education-59_en.
[27] **Sources:** Competence-oriented qualification profile for the education of educators at technical schools and Fachakademien; Standing Conference of the Ministers of Education and Cultural Affairs; http://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2011/2011_12_01-ErzieherInnen-QualiProfil.pdf.

ICT USE AND MEDIA EDUCATION IN ECE: TEACHER PROFILES SUMMARY

1. Teachers recognize the need for training in ICT and media education (in all countries).
2. Bulgaria, Germany, Greece, Portugal, and Slovakia have defined specific professional profiles for ECE teachers.
3. Only in Germany and Portugal there are references to the use of ICT and/or media education in such professional profiles:
   - Germany: Media literacy
   - Portugal: Use of technologies

ICT use and media education in pre-service teacher training curricula

The use of ICT for ECE teachers' pre-service training has also been studied (Kankaanranta, 2001; O'Rourke & Harrison, 2004). These studies identify some key elements of effective ICT professional development for ECE practitioners: understanding children's learning and development and being exposed to examples of integrated ICT use in real ECE settings.

European countries have sought to promote a high-quality workforce in ECE, namely by raising staff qualification levels, recruiting teams with several qualified practitioners, and continuously up-skilling the workforce (e.g. professional development) (Burchinal, 2018; OCDE, 2018, 2017b, 2017e).

Below, we present results obtained from the analysis of ICT use and/or media education in ECE pre-service training curricula in the five participating European countries (see Table 5). All countries include curricular units on the use of ICT and/or media in their pre-service higher-education training programmes, which usually last 1 semester (ranging from the 1st to the 8th semesters). Typically, the number of curricular units related to ICT or Media varies between 1 and 3 curricular units per programme. The number of ECTS of initial teacher training programmes ranges from 60 to 180 ECTS, with considerable variations across countries.

In Portugal, for example, the number of ECTS can vary from 2 to 5 depending on the programme/higher-education institution. Bulgaria reported an initial training higher-education programme for the media, that integrates a differentiated set of subjects in this area. In Germany, to become an ECE teacher one must attend full-time courses in a vocational school for 2 to 4 years. The curriculum at these schools differs from federal state to federal state. In most federal states, media education is a cross-sectional part of the curriculum. In some German federal states, there are courses that focus more on media. Media education, as well as the pedagogical use of media, ICT, and technology are parts of the curricula.

Table 5 - Examples of how ICT use and/or media education are addressed in initial teacher training curricula in Bulgaria, Germany, Greece, Portugal, and Slovakia.

Country	Programme	Curricular units	Duration	Year	ECTS
Bulgaria	Pre-school pedagogical degree (Sofia University)	ICT in education and work in digital environment	1 semester (2nd)	Year 1	-
	BA Programme in Media Pedagogy and Artistic Communication (Sofia University)	Theory of Mass Communication	1 semester (1st)	Year 1	-
		Art as communication	1 semester (1st)	Year 1	-
		Media science	1 semester (1st)	Year 1	-
		Introduction to Media Pedagogy and Artistic Communication	1 semester (1st)	Year 1	-
		Models and mechanisms for interaction – child-mass communication	1 semester (3rd)	Year 2	-
		Pedagogical and psychological basis for informational culture	1 semester (4th)	Year 2	-
		New media	1 semester (5th)	Year 3	-
		Multimedia	1 semester (5th)	Year 3	-
		Media pedagogy	1 semester (6th)	Year 3	-
	Degree in Pre-school pedagogy (Shumen University)	Information technology in education	1 semester (4th)	Year 2	-
Greece	Aegean University	Introduction to educational applications of ICT	1 semester (3rd)	Year 2	6 in 180
		Design, development and evaluation of educational applications of ICT	1 semester (4th)	Year 4	6 in 180
		Design, development and evaluation of online applications for e-learning	1 semester (7th)	Year 4	6 in 180
		Models of ICT applications in education	1 semester (8th)	Year 4	6 in 180
		Learning ICT systems	2 semesters (3th and 4th)	Year 2	6 in 180
		Practice stage: Applied teaching in ICT - 1st phase	1 semester (5th)	Year 3	6 in 180
		Practice stage: Applied teaching in ICT – 2nd phase	1 semester (5th)	Year 3	6 in 180
Portugal	Bachelors in Basic Education - Polytechnic Institute of Porto - School of Education	Multimedia Information and Communication Technologies	1 semester (2nd)	Year 1	2 in 180
	Bachelors in Basic Education - University of Aveiro	Didactics of Expression and Communication	1 semester (6th)	Year 3	4 in 180
		Didactics and Technology of Mathematics	1 semester (5th)	Year 3	4 in 180
		Optional: "Information and Communication Technologies and Basic Education"	1 semester (6th)	Year 3	4 in 180

Country	Programme	Curricular units	Duration	Year	ECTS
	Bachelors in Basic Education - University of Minho	Information and Communication Technology in the Professional Practice	1 semester (1st)	Year 2	5 in 180
Slovakia	University of Matej Bel Banská Bystrica	Mathematics and work with information	2 semesters	Year 1 and 2	-
	Commenius University Bratislava	Mathematics and work with information	-	-	-

Note: - Information not available. In Germany, there are no university courses and there are no ECTS that are comparable to the higher education courses in the other countries. In Germany, to become a ECE teacher attendance of a full-time vocational school for 2 up to 4 years is required.

In these countries, there seems to be different perceptions about the importance of addressing ICT and media in initial teacher training: Bulgaria and Germany seem to value media while Greece, Portugal, and Slovakia seem to focus on the use of ICT in education. In most countries (Greece, Portugal, and Slovakia), curricular units focus on the use of ICT or technologies for pedagogical purposes (e.g. teaching and learning, computing, ICT applications), in general. In Slovakia, there is a direct relationship between computer science and mathematics, which replicates the vision presented in its ECE curriculum. Bulgaria also highlights media education in some courses (e.g. Bachelor course with 4 academic years). The use of media resources, work in digital environment, or the use of online applications for e-learning are also subjects mentioned in the contents of the curricular units in initial teaching training in the different countries.

ICT USE AND MEDIA EDUCATION IN PRE-SERVICE TEACHER TRAINING SUMMARY

1. Bulgaria, Greece, Portugal, and Slovakia reported higher education curricular units focusing on the use of ICT and/or Media.
2. Initial teacher training curricular units usually last 1 or 2 semesters for the subjects related to ICT (ranging from 1st to 8th semester).
3. The number of initial teacher training curricular units related to ICT in education varies between 1 and 3 curriculum units per programme.
4. The number of total ECTS of initial teacher training ranges from 60 to 180 ECTS.
5. Bulgaria reported an initial training course in higher education regarding media.
6. In Germany, to become an ECE teacher one must attend a full-time vocational school for 2 up to 4 years. The curriculum at these schools differs from federal state to federal state. In most federal states, media education is a cross-sectional part of the curriculum.

Legal and ethical guidelines related to ICT and media use in ECE

Despite the fact that children are born in the digital era, it does not mean that they are digitally literate (e.g. Livingstone, 2011). Further, the United Nations Committee on the Rights of the Child (2014) recognizes the right to digital education. Regarding the participating countries, Bulgaria, Germany, Greece[28], and Portugal have specific legal or ethical guidelines related to ICT and media use with young children. Below, we present two cases where the legal and ethical guidelines related to ICT and media use with young children are more evident:

[28] **Source:** Legal framework, analytical programmers and supporting material by the ministry of education.

CASE OF GERMANY

"Under the Protection of the Young Persons Act (*Jugendschutzgesetz - JuSchG*), the Federal Review Board has the mission to protect children and adolescents from media contents harmful to minors. […] Media will be included in the List of Media Harmful to Young Persons if two thirds of the Board votes in favour of indexing, taking into account all aspects of the individual case."[29] The indexing procedures that must be followed are requested by youth authorities (youth welfare offices, ministries for youth affairs), by the Commission for the Protection of Minors in the Media, State Media Authorities, the Commission for Youth Media Protection [30], or at the urging of all other authorities (e.g. police authorities, customs offices, authorities for the protection of the Constitution or schools). Privacy protection is also valued and a concern reflected in the Protection of Young Persons Act (Jugendschutzgesetz – JuSchG[31]) and Child and Youth Services Act (KJHG) (Robert, Aurenz, & Muschter, 2018).

CASE OF PORTUGAL

The main precautions in using ICT and media with young children are to protect the identity, regulate access to data, and protect children's rights. For this there are, among others, one law and two orders: Data Protection Law, article 29 (Law no. 67/98, 26th October), Order No. 15847/2007, 23rd July, and Order No. 1495/2016, 6th September. To collect and use children's data, including image and sound, required procedures include an authorization request directed at the Directorate-General for Education to conduct school-based surveys; an authorization request directed at the National Data Protection Commission; an authorization request directed at the legal representative of participating children. The entities responsible for the protection of children and youth from exposure to media and ICT environments at the national level are the National Commission for Data Protection, the Directorate-General for Education (DGE), and the Regulatory Entity for Social Communication (Araújo, Aguiar, Monteiro, & Boavida, 2018).

All countries, except Slovakia, have laws related to ICT and media use with young children (e.g. Child Protection Law, National Programme for Child Protection –

[29] **Source:** http://www.bundespruefstelle.de/bpjm/Service/english.html.
[30] **Source:** http://www.bundespruefstelle.de/bpjm/Service/english.html.
[31] **Source:** http://www.bundespruefstelle.de/RedaktionBMFSFJ/RedaktionBPjM/PDFs/bpjm-juschgenglisch,property=pdf,bereich=bpjm,sprache=en,rwb=true.pdf.

Bulgaria; Protection of Young Persons Act - Germany; Legal framework, Analytical Programmes and Supporting Material by the Ministry of Education – Greece; and Data Protection Laws: article 29 (Law No. 67/98, 26th October); Order no. 15847/2007, No. 140, 23th July, and Order No. 1495/2016, 6th September – Portugal).

The European Union has approved the General Data Protection Regulation (RGPD)[32], which came into effect on 25 May 2018. This regulation aims to create a single set of data protection rules for all active companies in the EU, regardless of their location. Thus, the EU intends to implement stricter data protection rules and ensure greater citizen control over personal data, encompassing the data of young children. All European countries have common procedures to promote children´s security, internet safety, and the creation of positive online content, as defined by the European Data Protection Law. However, most participating countries (i.e. Bulgaria, Germany, Greece, and Portugal) had already expressed their concerns about this subject before this law came into effect, using national procedures to protect young children. In these countries, there are entities responsible for the protection of children and youth from harmful media at national level: Contact State Agency for Child Protection (Bulgaria); Protection of Young Persons Act (Jugendschutzgesetz - JuSchG), Child and Youth Services Act (KJHG) (Germany); Ministry of Education (Greece); and National Commission for Data Protection, Directorate-General for Education (DGE), and the Regulatory Entity for Social Communication (Portugal).

[32] For more information, see: https://ec.europa.eu/commission/priorities/justice-and-fundamental-rights/data-protection/2018-reform-eu-data-protection-rules_en.

However, there are still **media-related threats which must be considered by ECE practitioners and families**:

- ICT and media resources may not be adequate for young children's cognitive, physical, social, and emotional development, if associated with inappropriate content and contacts (i.e. exposure to unsuitable content or containing inappropriate gender, cultural, or social stereotypes; privacy, security, and consumer risks);
- There are concerns about health and safety issues, especially about reduced outdoor activities and physical exercise (i.e. sleeping problems, reduced social interaction);
- ICT and media resources are often seen as entertainment and non-educational toys, resulting in risks for the correct handling and security of the equipment, and lack of supervision and/or parental control;
- Also, the way ICT and media are used can serve as a means of excluding children and families (e.g. Roma families in Slovakia with low level of ICT skills).

How to promote digital safety in ECE?

Additional research is needed to focus on young children's digital media environment and young children’s online safety. However, the promotion of children’s safety has played an important role in European educational policies, resulting, for example, in

risk prevention programmes with children in primary education (e.g. eSafety[33]; Insafe/INHOPE[34]). Although the need to address internet safety and privacy issues for younger users has already been identified (O'Neill, Livingstone, & McLaughlin, 2011), ECE continues to be excluded from the majority of such programmes. Prevention and support programmes for safety and risk prevention with young children (i.e. from 3 to 6 years old) are particularly important, not only because young children are increasingly in contact with digital media, but also because of the specificities necessary to address the issue with young children and their families (Buckingham, 2013; Livingstone, 2011a, 2011b; Livingstone et al., 2012; Livingstone et al., 2015, 2017; Pereira et al., 2014).

EU Kids Online conducted a study on Children's Use of Online Technologies in Europe (Ólafsson, Livingstone, & Haddon, 2013) and found, among other things, greater inequalities in access to the internet and mobile technologies by younger children compared to older children and gaps regarding children's online risk exposure and consequent vulnerabilities and potential damage. The same study suggested that online safety measures should be targeted to younger children (Livingstone, 2011a). It should also be noted that in disadvantaged socioeconomic, cultural, or geographical

[33] "The eSafetyLabel (…) aiming to provide a secure and enriching environment, for safe access to online technology as part of the teaching and learning experience", including "Europe-wide accreditation and support service for teachers, head of schools and ICT administrators when it comes to: evaluating their school's online safety; taking action to improve and reinforce it and sharing best practices among their peers".**Source:** https://www.esafetylabel.eu/home.

[34] "Insafe and INHOPE work together through a network of Safer Internet Centres (SICs) across Europe – typically comprising an awareness centre, helpline, hotline and youth panel" **Source**: https://www.betterinternetforkids.eu/web/portal/policy/insafe-inhope.

contexts (e.g. rural areas) there is also greater propensity to "digital inequalities" (e.g. DiMaggio, Hargittai, Celeste, & Shafer, 2004).

Regarding online risks in the countries involved in this project, and according to data from Haddon, Livingstone, and the EU Kids Online Network (2012)[35], Germany and Greece are 'Lower use, lower risk' countries; Portugal is a 'Lower use, with some risk' country; Slovakia is a 'Higher use, with some risk' country; and Bulgaria is a 'Higher use, with a higher risk' country.

In the European context, the United Kingdom has studied the use of ICT and media by young children quite extensively. A recent report from Ofcom (2017) provided an overview of media literacy among United Kingdom children and young people aged 5-15 and their parents/carers, as well as an overview of media use by children aged 3-4. Based on interviews, Ofcom reported an increased concern among parents of children between the ages of 5 and 15 for online safety issues, including cyberbullying, giving out details to inappropriate people, time spent online, seeing content which encourages children and youth to harm themselves, reputation damages, and the possibility of children being radicalized online. Also, the frequent use of games and associated risks deserves special attention (e.g. time spent gaming, the pressure to make in-game purchases, gaming content, the amount of advertising in games, and

[35] In this study, and as conducted in previous EU Kids Online studies, countries were ranked according to how children experience online risk, based on students' questionnaire answers by children between age 8 to 16. The concept of use answers the question "How children´s use the internet?" according to the aspects such as: where; how; skills - children make the lowest or higher use of the internet. The concept of risk is associated with the question: "What online factors shape their experiences?" involving aspects such as positive content, user-generated content, sexual content / message, stranger contact, bullying, personal data misuse, on all risks apart from meeting online contacts – online and offline - countries are ranked according the below average, above or above the average of the 33 countries involved in the study.

the possibility of their children being bullied by other players). According to the results of this study, the most frequently used parental mediation strategy is the regulation of children's access and visualization of online content and services. This type of mediation implies a concern of parents with the maintenance of children's online security, the supervision of the child in the use of digital devices with online access, the definition of rules of use and also the use of tools to control access to online content (e.g. websites allowed or blocked). According to Paciga and Donohue (2017), parents of children from 3 to 5 years typically use active media mediation during child's interaction with media.

Also regarding online risks, there is evidence that reinforces the importance of parents and teachers supporting children in taking some risks online (e.g. Edwards, 2015; EU Kids Online, 2014) in order to support children's confidence in the use of online resources (Baker, 2014). Based on these findings, we should avoid the use of restrictive mediations, which could result in online risk factors due to the lack of experience and support for the exploration of online environments.

The importance of promoting active mediations through co-involvement and discourse on the risks of online activity with children is also increasingly emphasized, seeking to reduce risks (EU Kids Online, 2014; Livingstone, Marsh, Plowman, Ottovordemgentschenfelde, & Fletcher-Watson, 2014; Marsh, Plowman, Bishop, & Lahmar, 2015). Other studies investigated how software content or media itself could facilitate children's positive risk taking (e.g. Johnson, Becker, & Freeman, 2015; McPake, Plowman, & Stephen, 2013). In practical terms, research has highlighted the

role of communication as a factor in reducing online risks, so children can learn to use coping strategies (e.g. talking to parents, friends, and teachers, asking for advice). Research suggests the need to use parental control systems (e.g. remote control, blocking access to potentially dangerous content) as a way to keep children safe online, especially by controlling or restricting access to content, monitoring navigation online, setting time limits for use by the child, as well explaining to children that they should not provide personal information online (e.g. where they live), post pictures or videos of themselves without parents or teachers' authorization, share/post something online or being friends with people they do not know without reflecting on it (e.g. "not everyone online is who they say they are"). Regarding online child safety, it is essential that the educational context promotes positive online content for children, including balanced, adequate, critical, and proportionate digital resources. In several European countries, numerous initiatives have been carried out to promote the use of digital media in a conscious manner (e.g. day or week of the media).

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According to several experts, entities, and projects in the area of digital media education (e.g. Kids Eu Online, eSafety Label, Common Sense Media), teachers and educators should not only teach children behaviours that reduce online risk (e.g.

explain children how to use social media), but also protect the child's privacy on social media, and use media resources responsibly, creatively, and critically (e.g. definition and use of social media guidelines in the educational establishment; request explicit permission to divulge data, productions or images; edit, whenever necessary, sensitive information [e.g. blur image]; review the privacy settings on any personal social media accounts; build and share an inventory about care in the use of digital platforms with the educational community) or protect confidential information such as students' names, grades, assessments, or any part of a student's educational record. Below there is an example of networking about online security:

CASE OF GREECE

The Panhellenic School Network is a network on media literacy and safety, which supports and guides the work of adults with children. It involves synergies between several ministries and departments for internet safety in schools. It organizes, among others, an internet platform which allows parents to be informed about internet safety. It connects and supports about 16.500 schools in Greece, in both primary and secondary education, providing services for distance learning and e-learning, communication, e-governance, and support services for teachers, students, and management staff. Although ECE is not the target audience for this project, teachers working in this context can also integrate the activities of this networking platform. The network furthermore encourages cooperation among schools and exchange of information, conducts seminars and discussions online. The aim is to contribute to the creation of a new generation of educational communities, which utilize ICT in their daily educational process. A three-level structure is in place to support the functioning of the network: the central structure connects with centres established in each county capital, with equipment to ensure that schools within the county have optimal access to the network and its services (Papaioannou, 2018).

Ethics and Responsibility

From the point of view of children's rights, it is crucial to acknowledge that media culture is part of children's daily lives from an early age. Thus, its use in an appropriate manner may allow an increase in the provision of information and opportunities for self-expression and participation on the part of the child. The use of media resources with young children, a vulnerable public (Alderson, 2004; Morrow, 2008) in an educational context implies respect for ethical principles and responsibility to guarantee the fulfilment of fundamental rights of children, parents, and teachers.

The use of media resources with young children in an educational context implies respect for ethical principles and responsibility to guarantee the fulfilment of fundamental rights of children, parents, and teachers.

Thus, the use of digital media involving children (directly and indirectly) requires that several fundamental ethical principles be safeguarded, namely: (1) informed consent; (2) benefit, respect for integrity and risk; (3) privacy and confidentiality; (4) discontinuation of participation, and (5) dissemination of the activities developed (Almeida & Freire, 2010; Pocinho, 2012), which are described below.

1. *Informed consent* consists of clarifying what will be done (objectives, procedures, rights, and duties) with children and their parents;
2. *Benefit, risk and integrity* consists of the definition, analysis, and evaluation of the relationship between risks and benefits of the activities involved and the guarantee of respect for the integrity of the child (e.g. clarification on the advantages and risks of carrying out activities with digital media - that are always evidence-based; possible compensations for children and families - certificates of participation; and also reduction of risks of personal exposure of children – exposure to comparison of performances, dissemination of personal data);
3. *Privacy and confidentiality*, which consists of non-disclosure of individual and sensitive data of the child (e.g. photos, names, individual performances);
4. *Discontinuation of participation*, where parents are informed that they can, at any time, remove their consent and oppose to the digital social media exposure of content produced by children in the activities;
5. *Dissemination of the activities*, which consists of clarifying to the children and parents the decisions that will be taken, in a practical, responsible, and weighted manner, considering the superior interest of children and educational professionals. Thus, those involved should be informed about the pertinence of the dissemination of activities carried out with the community, and about the possible ways of disseminating them.

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The ethical and responsible concern about activities involving children is long overdue, but in recent years there has been increasing awareness of the child as an agent of opinion and position on the disclosure of information or individual productions, along with their legal representatives. More research is therefore needed regarding the consent of young children, since it must be guaranteed that children understand the purpose of their consent to participate.

LEGAL AND ETHICAL GUIDELINES SUMMARY

1. Germany and Greece have pedagogical guidelines related to ICT and media use with young children.
2. All countries have laws related to ICT and media use by young children.
3. All European countries have common procedures to promote child online security.
4. There are still threats related to ICT and media use which must be considered.

PART 3 - EUROPEAN RESEARCH FINDINGS ON ICT USE AND MEDIA EDUCATION IN EARLY CHILDHOOD AND ECE

In this section, we present European data collected from partners in the project, international reports, and research databases using keywords such as "Information and Communication Technologies" or "media education" and "early childhood education". We focus on accessible equipment, content areas, types of activities and goals. We also present a summary of available data on the use of ICT and media by children, children's preferences, the attitudes of teachers and parents toward ICT use and media education, and family mediation strategies.

According to several authors (Common Sense Media, 2013; Dias & Brito, 2016; Holloway, Green, & Livingstone, 2013; Marsh et al., 2005; Ponte et al., 2018; Ponte, Simões, Batista, Jorge, & Castro, 2017), the type of technological resources that have potential for the development of learning by children between the ages of 3 and 6 is varied, depending on the characteristics and ICT and media resources of children, families, and teachers.

The use of ICT and media creates new opportunities for learning through: stimulating the sharing of ideas and debate in a context of real interaction (e.g. news publishing); the promotion of collaboration between peers, teachers, and parents; encouraging creativity in communication; the promotion of oriented, supported, and supervised ICT interaction experiences; promote learning process about the world through screen media (e.g. support in the process of distinguishing between reality and fiction); safe experimentation and interactive learning; improvement of children's self-efficacy in

the use of ICT and the acquisition of knowledge; support for the examination of cultural diversity (with integrity and dignity); the promotion of social interactions and learning; the promotion of cooperation and team-building (e.g. Sesame Street can improve children' s language skills, critical thinking skills, and social skills) (e.g. Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Leinonen & Sintonen, 2014).

ICT and media also present risks that have raised concerns in parents and ECE professionals, including the possible relation between media violence and aggressive/violent behaviour, despite contradictory research data; negative associations with sleep regulation (e.g. screen media disrupts melatonin secretion); the relation with obesity and low academic performance; and the detection of children who display early signs of dependency and social or functional impairment. Parents therefore need more information about media and ICT to help them cope with growing concerns about problematic digital media overuse (e.g. risky, excessive, or impulsive use) (Funk, Brouwer, Curtiss, & McBroom, 2009; Hasebrink, Livingstone, Haddon, & Ólafsson, 2009; Livingstone, Mascheroni et al., 2015; Plowman & McPake, 2013; Zimmerman, 2008).

As a result, schools and teachers should support the role of parents in selecting, using, and regulating ICT and media by setting limits on their use and helping parents understand social media etiquette and privacy safeguards and explore and discuss these issues with children. Although media and ICT are often used as babysitter, reward, or punishment, their role should be rethought, balancing the risks, benefits, and contexts of their use.

Parents and teachers should regulate the use of ICT and media for children by setting limits on their use.

However, it should also be noted that digital interaction and media use will always depend on the characteristics of children, families, teachers, communities, and space/time. PISA results indicate that learning outcomes have not improved in countries that have heavily invested in technology (OECD, 2015a), maybe because of a lack of appropriate integration of ICT into the educational setting. There are also no statements as to whether media literacy has nevertheless improved, which could contribute to more effective use of ICT resources and a consequent improvement in student learning.

Education for the media and use of ICT in the ECE context require an understanding of the diversity of European identities, so that all children have access to high-quality education and are included, regardless of where they were born, the language(s) they speak, the socioeconomic status of the family, or where they live. That is why children should be educated on the social understanding of equalities and differences, seeking to find common values that allow for the construction of a sense of belonging.

ECE practices should be tailored to the interests and needs of children and their families and should respect the new educational and social requirements related to the promotion of multimedia literacies in family and pedagogical contexts. New

challenges appear in ECE to provide children the opportunity to take advantage of digital means for learning and acquiring literacies that they may not have at home, contributing to attenuating socioeconomic differences between families, thus creating opportunities for inclusion.

The recommendation of access to different electronic media and the development of skills involved in their use is fundamental in ECE (UNICEF) (Byrne, Kardefelt-Winther, Livingstone, & Stoilova, 2016). It is also important to develop the knowledge, skills, and attitudes toward ICT and media use in ECE children and professionals. Essential aspects such as identifying diverse types of ICT and their usefulness, being able to produce media content, or knowing where to go to get information must be developed from an early age, considering children's development profile and their contexts. Thus, the development of digital literacy competence should be included as a key goal of ECE professionals' work with children between the ages of 3 and 6, allowing for the acquisition of skills useful for the child as an individual, but also for social interaction, and for the development of learning (e.g. collaboration and communication; production and sharing productions).

Every day, children from 3 to 6 years access technologies and media resources (e.g. television) for recreation activities (Common Sense Media, 2013; Holloway et al., 2013a; Ponte et al., 2018). However, parents do not always feel able to mediate and take position on the media used by their children. They recognize the advantages (e.g. cognitive, language, motor development) as well as the risks that may be associated with this use. Yet, media use and media education among young children, families,

and teachers remain under-valued in the support policy measures of some countries (Holloway et al., 2013a). Further, the lack of research about ICT skills and media use by children aged 3 to 6 years across countries is evident, including Bulgaria, Germany, Greece, Portugal, and Slovakia.

Next, we present some data on ICT and media education in ECE across these five European countries (Araújo et al., 2018; Bozhkova & Dobrev, 2018; Papaioannou, 2018; Robert et al., 2018; Sklenka & Strazik, 2018), highlighting data from national and international research.

Most of the studies developed on this topic within ECE are case studies that portray specific realities of one or several contexts without trying to represent the reality of the country. Over time, the focus has changed from descriptions of ICT resources available, to the activities developed, and finally to how the use of ICT and the media modifies learning and teaching. Currently, there is a cross-cutting view in most European countries that seeks to harness the potentials of ICT and media for children's learning and development and control their possible negative effects. Next, we present examples of research findings on ICT and/or media use in early childhood and ECE.

Media education and young children

Many studies have explored young children's behaviours and interactions with screens in family and school contexts, with or without the presence and mediation of adults, which have shown that the use of ICT and media education may be beneficial

for developing skills in young children such as language and mathematical thinking. Further, studies on young children´s internet use in Europe (Livingstone et al., 2017) have sought to identify the opportunities and risks of these technologies for learning. However, several researchers have recognized the lack of knowledge about the status and development of young children's digital skills, especially under age 6 (Chaudron et al., 2015; Chaudron et al., 2018).

According to European research data, children's use and preferences regarding digital devices are influenced by characteristics of the children, families, and schools (Chaudron, Di Gioia, & Gemo, 2018). Research shows that children usually acquire digital skills mainly in the family context (Chaudron et al., 2018; Holloway et al., 2013b), by observing and mirroring the behaviour of adults or siblings (Chaudron et al., 2018).

Young children's competencies related to media and ICT use

There are no representative national studies assessing the skills of children aged 3 to 6 years on the use of ICT and media resources in the five countries involved in Kit@ (Bulger, Oxford Internet Institute, & Livingstone, 2013; Chapman & Insights, 2016; Chaudron et al., 2018; Hartai, 2014; Holloway et al., 2013b; Livingstone et al., 2017). However, it is possible to note that there are some studies, especially case studies, which mention/indicate that children use these features daily, especially tablets, to play, watch videos or listen to music, often supported by families and after meal times (e.g. Brito, Francisco, Dias, & Chaudron, 2017; Chaudron et al., 2015; EU Kids Online, 2014; Ponte et al., 2018; Ponte et al., 2017; Sefton-Green et al., 2016). Also, teachers who care for these children recognize their ease in handling digital devices. They further reveal that children do simple searches of songs or series of drawings they like, as well as draw or play on from tablets or mobile phones.

According to the few studies in the European context, children of this age group use TV more, especially in the family context. In turn, the tablet is the most popular device among young children. Young children tend to have their own devices, which increases the risks of exposure to unsuitable content as young children are not fully aware of the risks associated with the use of digital technology (Chaudron et al., 2018; Palaiologou, 2016; Ponte et al., 2017).

The degree of competence in digital media by children depends on the personal and contextual factors of the child, such as age and experience of use in the family context or school. Some data on young children's competences related to media/ICT use in Portugal are presented below.

CASE OF PORTUGAL

Research data are not consistent regarding the skills of children from 3 to 8 years, in the use of digital media. On the one hand, according to Ponte et al. (2017), children from 3 to 8 years were observed handling a device with internet access, using a variety of ways to find content of their interest: with the help of family members, especially if they do not know how to write; through Google, which directs them to YouTube, etc. On the other hand, according to Faria (2014), young children did not yet have technical skills; however, they played a decisive role when they were involved in group research, when they analysed and selected, so the motivation to learn contents was always present (Araújo et al., 2018).

Young children can play on the tablet, watch and select programmes on television, perform activities such as painting while still listening to music or watching videos. However, they sometimes resort to the help of family members or adults to assist them in some difficult tasks (Brito, et al., 2017; Chaudron et al., 2018; Gutnick, Robb, Takeuchi, & Kotler, 2011; Livingstone, Haddon, Gorzig, & Olafsson, 2011; Mascheroni, Livingstone, Dreier, & Chaudron, 2016; Nikken & Schols, 2015; Ponte et al., 2018; Ponte et al., 2017).

Research is not clear regarding the technical skills for the use of media by young children. There are studies that highlight the technical skills of children and others that highlight some gaps for autonomously mediated use by young children (Chaudron et al., 2015; Common Sense Media, 2013; Faria, 2014; Plowman & McPake, 2013). Thus, it seems that technical skills vary among young children and depending on several factors, such as their levels of development or their ability to interact with screens (including understanding and reflecting about the process) (e.g. Buckingham, 2014; Pereira et al., 2014). At the same time, other studies have argued that learning to use

digital media by young children mainly involves exploration, trial and error, and observation (e.g. Brito et al., 2017; Chaudron et al., 2018).

Young children's preferences related to media/ICT use

In this age group, the tablet is the preferred device to promote children's interaction with ICT and media, used by both children and teachers (Chaudron et al., 2018; Feierabend, Plankenhorn, & Rathgeb, 2014; Ponte et al., 2018; Ponte et al., 2017). These data corroborate results from previous studies (Dias & Brito, 2016; Marsh, 2014). Children aged 3 to 6 generally watch television every day and usually in the company of their family, dividing their attention between educational programmes and family programmes. Fewer children also use game consoles. The type of programmes children prefers (e.g. television channels or movies) varies by age and gender, as found in previous studies (e.g. Ponte et al., 2018; Ponte et al., 2017). Some of the results of young children's preferences related to media/ICT use in Germany, Bulgaria, and Portugal are described below.

CASE OF GERMANY

In Germany, 80% of children have no personal media device. However, the use of digital and media devices by children is common. Around 79% of children spend time watching TV, with an average time of 43 minutes/day (2-3 years: 34 minutes, 4-5 years: 52 minutes). The preferred TV channels are: "KiKA" of the German national TV networks ARD and "ZDF" and favourite TV programmes are "Unser Sandmännchen"; "Die Sendung mit der Maus"; "Vicky the Viking"; "Sesame Street"; and "KiKANiNCHEN". Painting and drawing activities are common for 75% of German children (Robert et al., 2018). Everyday life among children between the ages of 2 and 5 years is mostly spent playing (at least once every week: indoors 99%, outdoors 93%). Aside from that, time is spent with books (looking at/being read to, 87%) and TV is also deeply rooted in the children's life (79%). Apart from TV, creative pursuits such as painting, handicrafts, and drawing (75%), and meeting friends (68%) also play an important part in the child's day-to-day life. This applies especially to 4 to 5-year olds (Feierabend et al., 2014).

CASE OF BULGARIA

In Bulgaria, the use of digital and media devices by children, from 3 to 5 years, is common and children's daily lives are spent in front of the TV or computer. There is at least one TV in every home, 60% have a computer at home and a DVD player that children can use, according to data from 2012[36] survey. Also, 30% of families have stereo players and 20% have tablets. Almost half of the children spend more than 1hour daily on the computer (47.5%) and they know how to use the internet (67.5%) and start and play internet games by themselves (65%)[37]. In a case study, 70% of the children reported that they watch TV between 2 and 3 hours per day. Bulgarian children prefer watching TV or DVDs (60%), playing on the computer or tablet (20%), and playing with friends (20%) (Mitev & Kovacheva, 2014). The favourite programmes for boys to watch are: "Batman", "Spiderman", the "Ninja Turtles" and for girls, "Barbie Charming", "Witch", and "Princess". Bulgarian children prefer watching films and cartoons, music and TV competitions, and entertainment shows and the most popular TV channels are "Cartoon Network" and "Fox Kids". Bulgarians also like "Diema Family". Bulgarian children's movie preferences are: "Ice Age", "Pirates of the Caribbean", "Shrek", "Frozen", "Masha and the Bear" and "Home alone "(Bozhkova & Dobrev, 2018).

[36] **Source:** http://studentskigrad.eu/index.php?option=com_content&view=article&id=1873:2011-09-15-07-21-07&catid=82:2011-03-24-21-06-18&Itemid=116.

[37] **Source:** https://www.safenet.bg/images/sampledata/files/Digital-and-Media-Literacy.pdf.

CASE OF PORTUGAL

From 3 to 5 years, the tablet (54%) is the most used device, followed by the mobile console (47%), the mobile phone (36%), and the laptop (35%). Also, consoles (64%) and tablets (59%) are the devices most owned by children of this age group. Families and children from 3 to 8 years have daily access to the internet, especially from the tablet (Ponte et al., 2017). Children between the ages of 3 and 5 tend to watch more children's television programmes that are not cartoons (70%). They also watch TV programmes on "animal/wildlife/nature" (51%), "soap opera" (33%), and "documentaries on science or stories" (14%) (Ponte et al., 2017). The results of the national survey on the consumption of electronic media by children between the ages of 3 and 8 show that there is at least one TV (99%) and one mobile phone (92%) per household. The laptop (70%) and the tablet (68%) follow. Around 94% of children between 3-8 watch TV every day, on average 1h41 minutes (more on weekends), especially in common spaces of the house (Ponte et al., 2017). Parents report that children watch the Panda channel (87%), TVI (73%), SIC (70%), Disney (69%), and RTP1 (66%). In terms of frequency, 75% of the children watch Panda daily, 56% watch Disney channels, and 46% watch TVI. The consumption of generalist channels is higher among children between the ages of 3-8 from families with lower schooling. TV content, cartoon videos, and games are the most consulted contents for children between ages 3 to 8 on the internet (Ponte et al., 2017). Also, according to Dias and Brito (2016), the main results regarding the individual use of digital technologies by children show that the tablet is their preferred device; games are the main activity; gender is associated with the choice of games and activities; digital activities mirror offline preferences and children are able to use technologies autonomously (Araújo et al., 2018).

ECE teachers´ perceptions about their knowledge, attitudes, self-efficacy, and practices toward ICT use and media education

According to a survey on ICT use in Europe (DG Communications Networks, 2013), teachers support students in the use of digital technology, exploring their potentialities and feeling motivated to use them. However, often "teachers simply have not had the time (or the perceived need) (...) to understand how to use media texts or to promote critical thinking" (Hobbs, 2004, p. 56). The importance of teachers in learning how to

use digital technology is also highlighted in other European studies (e.g. Chaudron et al., 2018).

In general, teachers have a positive perspective on their use of ICT in the context of ECE; however, some constraints on children's use of ICT in ECE are usually presented. The results of case studies in Greece have indicated a lack of ICT resources, internet safety issues, and insufficient qualifications. Some of these constraints are also found in studies in Germany and Portugal, namely the lack of resources and skills of teachers for the use of ICT and media in the pedagogical context and in direct work with children (e.g. Friedrichs, 2015). The following are examples of ECE teachers' practices regarding media / ICT use, identified in European countries, including data on ECE teachers' perceptions about their knowledge and self-efficacy.

CASE OF GERMANY

"Ulrike Six carried out two studies for the state of North Rhine-Westphalia. Regarding the educational situation and the attitudes of ECE teachers regarding the topic "Media education in kindergarten", Six and colleagues (1998, 2002) found that ECE teachers emphasize the need for media education, but do not integrate it in their educational concepts or in their practical activities with children. Reasons for this include, among other things, inadequate media education training. For example, key issues such as "goals and practice of media education in kindergarten" are not part of the training of a sizable proportion of respondents. Continuing education on media education and media educational materials are not well-known. Further, media education is considered less important than other educational areas (about 60% see it that way). According to Six and Gimmler (2007), intensive media education is only practised by a small number of ECE teachers (20.7%). Approximately seventy percent of the interviewees think that the kindergarten does not adequately fulfil the mission of media education. Only very few can describe what media education is and what goals are associated with it. Often, media education is confused with media didactics, that is, media use for other educational purposes is considered as media education. There is lack of knowledge about how media education can be implemented without elaborate measures and preparations. ECE teachers often feel overwhelmed in the practical implementation of media literacy activities and pursue conservative-pedagogical approaches." (Neuß, 2013, p. 38). Teachers recognize inadequate training and knowledge in media education and lack of resources to support media education (Robert et al., 2018).

CASE OF GREECE

Teachers recognize inadequate training and knowledge in media education, but 93.1% have training in computers[38]. Teachers also refer to lack of resources to support media education, but 82.2% work in classroom where children has access to computers called "computer centres"[39] (Papaioannou, 2018).

[38] **Source:** https://www.tandfonline.com/doi/full/10.1080/02619760420002118 38?scroll=top&needAccess=true.
[39] **Source:** https://apothesis.eap.gr/handle/repo/33120.

CASE OF BULGARIA

Teachers have positive perceptions about ICT use in ECE. They use ICT for creating their own materials (78%), adapting already available resources (73%), and use learning resources (82%) (Terzieva, Todorova, & Kademova-Katzarova, 2016). Some resources used by teachers are e-books, educational websites, and educational games. Examples of Bulgarian ICT resources used for ECE include: computer systems, multimedia projectors, interactive boards, multimedia systems, interactive devices (e.g. "Bee-Bot"), tablets; software tools (electronic textbooks, web-learning platforms, systems for organizing and managing the learning process); internet technologies (social networks, blogs, websites) (Bozhkova & Dobrev, 2018).

CASE OF PORTUGAL

Teachers recognize the potential of technological devices and media education in the preschool age. Positive teachers' perspectives on the use of ICT in ECE include the recognition of children's abilities to use ICT in a supported way and highlight these resources as motivational and able to promote learning (Araújo et al., 2018). Teachers mention some advantages of ICT use, namely, promoting creativity and imagination, promoting learning, improving collaboration among students, broadening students' view of the world, promoting involvement with school content, stimulating oral language acquisition, and doing things quickly and easily. They also recognize inadequate training and knowledge in media education and refer to lack of resources to support media education. Teachers mention using ICT for planning activities (93%), documenting children's assessments (88%), preparation of worksheets (87%), evaluating activities (87%), and other purposes (67%). Educators also use MOODLE platforms (44%) and communicate with parents through e-mail, chat, or forums (31%) (Brito, 2010). Teachers refer to using the computer with children between 15 to 20 minutes. The type of ICT activities with children are: creation and production of digital narratives (e.g. Audacity and Movie Maker); using programming language (e.g. ScratchJr); drawings; subject-oriented research; viewing videos on YouTube; taking photos; making audio or video recordings; sharing activities with parents (e.g. blog sharing, Facebook page, or school page of the activities performed); CD-ROMs use; Microsoft Word use (Brito, 2010). Also, television viewing activities is frequent in Portuguese ECE (Ponte et al., 2018; Ponte et al., 2017). Examples of ICT resources for ECE include applications such as Myebook, Glogster (presentation of works/projects or advertise activities), mind42 (which reconciles text and image), bubbl.us, Slideshare, Showbeyond, Stupeflix, DivShare, Photopeach, YouTube, Animoto, Podomatic, Voicethread, Voicethread, Scratch, Google Earth, Skype, Photobucket, Art pad, Audacity, Jigsaw Planet, Wordle (Araújo et al., 2018).

In sum, professionals have positive views but recognize the need to improve their ICT and media literacy skills. Although some contradictions regarding the number of resources available and adequate conditions for their use in the ECE context were highlighted, teachers seem to identify different forms of ICT use. As a result, there is a need to develop activities with children which promote the safe and accurate use of media. However, many questions arise regarding media education for young children because of lack of research in this area.

Families' attitudes and concerns regarding media/ICT use

Families are now learning to deal with the challenges of technology and experience with media in their children's education. Parents can provide important information regarding the media use of youngsters; in turn, teachers can advise parents on ICT/media consumption to try together to assist children in understanding how to extract knowledge (Pereira, 2000). Parents need to mediate the use of ICT and media to help build the digital experience for young children through flexible strategies tailored to the interests, needs, and age of the child (Blum-Ross & Livingstone, 2016).

Teachers can advise parents on ICT/media consumption in order to try together to help children in extracting knowledge (Pereira, 2000).

Chen and Tu (2018) found that parents recognize the value and usefulness of internet use in preschool pedagogical activities, especially in supporting the development of younger children. They also consider ICT to be innovative and useful tools that improve their day-to-day life (e.g. work).

CASE OF GERMANY

According to the miniKIM study 2014, there is no information about parents own preferences and opinions on the topic of computers and the internet in the German context. However, "nearly nine out of ten parents believe that the internet is dangerous for children. Three quarters think that children should only surf the net if a special filter programme is installed on the PC. Only 13% of parents would allow their child to use the internet without supervision" (mpfs, 2015, p. 32). Parents of children attending ECE in Germany consider the topic "children and media" of medium importance and by 75% of parents, knowledge on the topic of "children and media" is considered good or very good.

CASE OF PORTUGAL

Parents of children from 3 to 8 years are frequent users of digital media: 80% state that they are internet users and 68% access the internet daily, especially at home (96%). Parents express concerns about the use of the internet (81%). However, there are references to interactions between parents and children, with or about the use of ICT and the media, such as: children talking with parents about things on the internet (52%), children asking parents their advice on how to act on the internet (23%), and children asking parents to buy products/services on the internet (19%). Families with children between the ages of 3 and 5 have more game consoles (64%), followed by tablets (59%), and TV (58%), than families without children (Ponte et al., 2018; Ponte et al., 2017). Social concerns of parents and ECE professionals include the fact that digital media does not provide social interaction. Parents think that there is no need to worry about the digital safety of children because they are still very young. Some also report concerns about risks and opportunity awareness: according to parents, YouTube is where children are most exposed to risks; activities related to educational learning using ICT are explored infrequently; digital devices have the advantage of doing things quickly and easily (Dias & Brito, 2016).

CASE OF BULGARIA

The information regarding parents' opinions and preferences about children's use of the computer and the Internet: 52.5% of parents refer to alerting children to what they should not do on the Internet. Most children report discussing with their parents what they see on television (62.5%). Some children ask their parents to help them choose the content they want to watch on TV (55%) and just under half of the children prefer to watch TV alone instead of being accompanied by their parents (47.5%) (Terzieva et al., 2016).

ECE initiatives and activities that build on ICT and media to promote family involvement in children's learning

There is general agreement about the importance of promoting home-school communication and learning at home, involving the family in the activities developed in ECE. ICT and digital media are tools that potentiate these interactions. However, participatory approaches involving families in pedagogical activities and in decision-making processes seem to be scarce in the case of participating countries. Findings suggest the need for a potential increase in family-school partnerships to promote student's academic achievement and development, since parental involvement in education improves children's outcomes (Harris & Goodall, 2008). Below, we present resources that use media and ICT to promote the involvement of families in children's learning.

CASE OF PORTUGAL

Platform "+Cidadania" - +Citizenship is a platform for the collaboration and sharing of ideas, targeting children in preschool and primary education, which aims to prevent and reduce early school leaving and promote equal access to quality education. The platform presents a learning environment rich in technology and a facilitator of learning. This platform was created by a company, LUSOINFO, in partnership with the Institute of Education of the University of Minho and financed by NORTE 2020, Portugal 2020, and the European Union. The platform includes: Mural - Social and Community Network; Contents - Digital Educational Resources with hundreds of multimedia, interactive, and dynamic activities (e.g. Portuguese Language, Mathematics, World, English Language); Badges - Rewards awarded by ECE teachers and coordinators. It is currently available to children between 3 and 11 years old in several Municipalities (e.g. Braga, Barcelos, Vizela, Cabeceiras de Bastos, Nazaré, Gondomar, Monção), in articulation with school clusters. Children, parents, and teachers are allowed access to the platform, aiming to reduce the distance between schools and the family. Access requires credentials, usually made available by city councils.

Practice Community: "Arca Comum" - Example of an Ibero-American practice community of ECE professionals where experiences and partnership projects are shared and created between educators and children from different countries (e.g. Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, El Salvador, Spain, Ecuador, Guatemala, Mexico, Nicaragua, Dominican Republic, Uruguay, Paraguay, Peru, Puerto Rico, Portugal and Venezuela).

Educational Blogs – Preschool onwards - The Directorate-General of Education provides technical and pedagogical support for the use of educational blogs that seek to promote the validation and dissemination of good practices, including the teaching of children between the ages of 3 and 6. Example of an educational blog regarding preschool: http://primeiraetapa.blogspot.pt/.

Platform "da janela do meu jardim" - ICT can allow the construction of practice communities of ECE professionals that stimulate professional development and partnership projects. For example, the Platform "da janela do meu jardim" is considered an example of good practices with ICT in ECE by the Directorate-General of Education of the Portuguese Ministry of Education. Work with this platform also gave rise to a doctoral thesis (Faria, 2014), predominantly qualitative, which aimed to understand how the various digital resources can contribute to learning and the integral development of children in ECE. The results of this study indicate that parents also interacted with the platform in an active way, making comments and maintaining two-way communication with teachers.

Education Newspapers platform - **Preschool onwards** - The Education Newspaper platform coordinated by the Educational Resources and Technologies Team aims not only to support education practices through content sharing and peer learning, but also to disseminate good practices in the use of newspapers in an educational context, acknowledging the work conducted by teachers in schools, with their students. It also intends to equip teachers, students, and schools with knowledge and tools to enable them to digitally publish their newspapers, giving rise to new formats or even to new projects.

The following resources aim to help parents and teachers ensure children´s safe access to media.

CASE OF GERMANY

GMK Society for Media Education and Communication Culture: Overview for the Promotion of Media Literacy (sorted by Federal States): http://www.medienkompetenzbericht.de/links-datenbanken.php

Selected projects and initiatives targeting parents:

Klicksafe.de: is an EU initiative for increased security in the network, covering all areas of internet usage, with brief information on the website and on flyers.

Internet-abc.de: Information, tips, and tricks about the internet for children and adults is a joint initiative of all state media authorities in Germany, offering a special section for parents, including an internet surfing license. "The Internet ABC offers assistance in getting themselves and their children ready for the Internet and acquiring knowledge about the opportunities and risks of this medium and learning how to use this knowledge together with their child!"

Flimmo.de: TV programme advice for parents.

seitenstark.de: is a network of websites for children that meet the open Seiten-stark-quality criteria and, among other things, strives to guarantee security against data misuse and commerce.

fragFINN.de: offers a sheltered surf room created especially for children; parental control, a "whitelist" of media-pedagogically certified pages, and it is available free of charge.

surfen-ohne-risiko.net: supports parents in the media education of their children.

Data on ICT use and media education in ECE

The objectives, themes, and types of activities / initiatives that can promote media education and the use of ICT in the context of ECE include: the use of content and context of the media (e.g. television and movies, digital media footprint, online behaviour) and digital literacies; reflection on screen time: consumption, creation, and communication; as well as the role of children and teachers in the use of ICT and media (e.g. passive or active, consumptive or creative, and isolating or community-building).

It is known that children are increasingly using ICT and the media. In the United States of America, average screen time for children between 2 and 4 years, in 2013, was 1h 58 minutes per day and for children between 5 and 8 years was 2h 21 minutes per day, with both groups dedicating more time to watching TV, watching DVDs, or listening to music (70%). Children between 5 and 8 years watch more entertainment shows like American Idol (70%) while children between 2 and 4 years watch more educational shows like Sesame Street or Mythbusters.

ICT is more pervasive and young people access it earlier and spend more time using it (OECD, 2015a). Teachers and parents play an important role in helping children use digital media (Chaudron et al., 2018; DG Communications Networks, 2013). The school context works as a stimulus to the exploration of media skills and activities (Chaudron et al., 2018). European data show that teachers can enable safe and critical use of digital media at school from an early age (Chaudron et al., 2018).

In Europe, there are some studies on the risks of digital technology use by children (Livingstone et al., 2015; Plowman & McPake, 2013). However, there is a lack of knowledge about how to provide support for young children's digital engagement, in European and national policies (Chaudron et al., 2018). Aspects such as knowledge, attitudes, and skills, as well as the influence of the child's characteristics and context (family mediation, access to digital media) need to be further studied (Chaudron et al., 2018). A European interview study of 10 families per country with children aged 0-8 has shown that there is great variety regarding perceptions, usage, and skills related to digital technology of children and parents, and that these change over time (Chaudron et al., 2018).

Parents believe that digital media are indispensable for the education of their children (Chaudron et al., 2018). Parents tend to delay children's access to the digital world, have difficulty recognizing digital skills in their children right away, but acknowledge the gains they make by using touch screens that go beyond operational skills (Castro et al., 2017). European parents are becoming more involved in children's digital activities, questioning their actions more when they sit next to them (Mascheroni et al., 2016). Most parents implement protection strategies that limit and control digital access in one form or another (Chaudron et al., 2018). “Parents' mediation strategies - open, permissive, supportive, restrictive, or 'laissez-faire' - are influenced by personal experiences and socioeconomic background” (Chaudron et al., 2018, p. 13). Research has also showed that "the greater the parents' familiarity with the internet, the greater the ability to mediate the use of the internet by the child, and the more active and competent their children are to use the internet" (Livingstone et al., 2015, p. 7).

The recommended screen time for pre-schoolers is between 1 and 2 hours (Campaign for a Commercial-Free Childhood, 2010; Funk, Brouwer, Curtiss, & McBroom, 2009). Screen time is the total amount of time spent in front of any and all screens (Common Sense Media 2011; Guernsey 2011c).

In Europe, there is a tendency for increases in screen time regarding children´s age, as well as changes in children's interests (e.g.Blum-Ross & Livingstone, 2016; Feierabend et al., 2014; OECD, 2015a), initially more directed to educational shows and later to more familiar programmes such as entertainment shows.

Although there are differences in the use of ICT and media with young children in ECE, all participating countries report an increase of the educational approach in the use of these resources and the recognition of support on the part of national and international policymakers to promote the improvement of ECE. Some examples of ICT and media practices in the context of ECE include:

- Play and development of artistic activities using digital photos, video clips, and audio recordings which can allow children to understand that media are more than entertainment programmes;
- Talking about stories previously read or programmes seen to structure and present ideas in an orderly manner or draw direct or indirect meaning from actions in the story (e.g. feelings, predictions of events);
- Creating digital photo frames with family and colleagues;
- Building digital books.

Use of ICT resources does not necessarily mean improvements in children's learning. Also, media indulgence, in which children are merely consumers has lost adeptness across countries (Abreu et al., 2017; Chapman & Insights, 2016; Feilitzen & Carlsson, 2002; Divina Frau-Meigs, Velez, & Michel, 2017; Hartai, 2014). The exploration of new forms of interaction between children and media is gaining ground. These new forms of interaction include adults assisting children in the development and sharing of media content, which entails greater knowledge about media backstage. New challenges and a new reality require mastery and understanding, for example, of the impact of media on the child's daily life.

EUROPEAN RESEARCH FINDINGS ON ICT USE AND MEDIA IN EARLY CHILDHOOD AND ECE SUMMARY

1. Children (aged 3 to 6) often access technologies and media resources daily (e.g. television) for recreation purposes.
2. Young children can play on tablets, watch and select programmes on television, and perform activities such as painting, listening to music, or watching videos.
3. There are increasing concerns about health and well-being of children due to exposure to technology and screens from an early age.
4. Parents and teachers recognize both advantages (e.g. cognitive, language, motor development) and risks of technological devices and media in the preschool age.
5. Teachers recognize children's abilities to use ICT and media in a guided way and highlight these resources as motivational.
6. Media and ICT are often used as babysitter, reward, or punishment.
7. Parents do not always feel able to mediate and take position on media use by their children.
8. Parents need more information about media and ICT to help them cope with the growing concern about problematic digital media overuse.
9. Families with children between the ages of 3 and 5 have more game consoles, tablets, and televisions than families without children.
10. Children's preferences at this age are the use of the tablet and watching television.
11. Television channels or movies preferred by children vary across gender and age.
12. ECE teachers report a positive perspective on the use of ICT and media.
13. ECE teachers refer to some constraints on children's use of ICT in ECE, namely: lack of resources, insufficient teacher skills, and variety of demands, knowledge, and skills of children.
14. ECE teachers report the following uses of ICT: planning activities, creating own materials, adapting resources, documenting children´s progress and evaluating activities, preparation of worksheets, accessing platforms (e.g. Moodle), accessing learning resources, and communicating with parents.
15. Types of ICT and media activities involving young children include: creation and production of digital narratives (e.g. Audacity and Movie Maker); using programmes (e.g. Scratch); drawings; subject-oriented research; viewing videos on YouTube; taking photos, making audio or video recordings; sharing activities with parents (e.g. through blogs, Facebook pages, or school webpage).

PART 4 - PROFESSIONAL DEVELOPMENT APPROACHES FOCUSING ON ICT USE AND MEDIA EDUCATION IN ECE

This part focuses on professional development and provides examples of relevant local, regional, national, and international initiatives, highlighting some European projects. Best practice examples and examples of resources on ICT use and media education in ECE are also presented.

It is important to consider relevant professional development[40] (PD) initiatives that focus on ICT use and media education by ECE teachers. Professional development should aim, among other goals, to strengthen the use of professional networks, to inform practitioners about new developments and existing sources of funding, and to raise awareness of potential and best practices in using ICT and new media.

According to Vuorikari et al. (2016), the professional development of teachers should include:

- critical and reflective thinking;
- teamwork and communication;
- building trust and positive relationships;
- development of initiative and flexibility;
- leadership;
- project and ambiguity management;
- and knowledge of child developmental domains.

[40] Training activities to support teachers' professional practices in ECE settings, designed to prepare individuals for work with and on behalf of young children and their families, as well as ongoing experiences to enhance this work.

In the five participating European countries there are national ICT PD programmes, sometimes funded by the government, as can be seen in the summary table below.

Table 6 - ICT use and/or media education professional development (PD) initiatives in Bulgaria, Germany, Greece, Portugal, and Slovakia.

Country	Main initiatives	Main training entities	Main area for professional development activities
Bulgaria	Public	Government or Municipal initiatives	ICT education resources
Germany	Private	Associations	Media education
Greece	Public	Associations	Educational applications of ICT
Portugal	Public	Universities	Digital technologies and literacies
Slovakia	Private	Associations	Use of ICT tools

Note: The training courses selected for this analysis respected the criteria of targeting teachers, addressing media and ICT in ECE, by a recognized or certified training organization. In some cases, accessibility to more teachers (e. g., public sector or the largest number of actions in the country) was also considered.

There is a wide variety of entities responsible for PD or continuing teacher training. In Bulgaria, Germany, and Portugal there are public institutions (e.g. government departments, municipalities) and private institutions (e.g. associations) that are responsible for continuing teacher education. In Bulgaria and Portugal, most continuing teacher training initiatives are public, while in Germany they tend to be private. In Greece, actions tend to be developed by public entities, which include associations and training entities, or are funded by universities. PD initiatives in Germany, Greece, and Slovakia are usually the responsibility of associations.

Across countries, ICT and media education is an area for PD activities. Regarding specific PD topics within this area, Germany seems to value the importance of media education (education and literacy). There are also PD initiatives on media in Portugal and Bulgaria (e.g. promoting digital literacies). In Bulgaria, Greece, Portugal, and Slovakia continuing teacher training focuses on the use of technology in an educational context, through the promotion of active and interactive learning, as well as access to technological solutions or tools that aid the learning process. In Slovakia, training focuses on the use of specific ICT tools (e. g., whiteboard, Alfík).

There is a tendency to deliver PD on ICT and media education in a face-to-face format. However, in Greece and Portugal, online training through e-learning and b-learning formats is also available. The duration of PD initiatives varies from country to country, ranging between 3 and 50 hours. For example, in Portugal, PD training typically lasts between 3 to 25 hours, in Greece normally lasts 36 hours, and in Germany lasts from 8 to 48 hours. In some countries, such as Greece and Bulgaria, there are longer programmes that may result in a degree and range from 1 to 6 semesters.

Types of PD initiatives available in these countries range from introductory to advance courses, equipment-specific training, and modular training[41]. Bulgaria delivers mostly introductory courses, followed by modular training or advanced courses. Germany

[41] Modular training is a course that is shorter than a full term. A week is the common module length, but it can be shorter or longer depending on content and teaching style. These trainings allow for the update or improvement of the theoretical and practical knowledge of adults with the objective of raising their levels of academic and professional qualification. This type of training allows the student to complete sections or modules [a module can be defined as a unit, chapter, topic, or segment of instruction] of training according to their time plan and availability.
Sources: https://registrar.wisc.edu/modular/; https://sites.google.com/a/boisestate.edu/si2013/self-serve-resources/a-primer-on-course-design/using-a-modular-approach-to-course-design; https://bdfaq.iefp.pt/index.php?action=show&cat=90; http://www.anqep.gov.pt/aaaDefault.aspx?f=1&back=1&codigono=56266236AAAAAAAAAAAAAAAA.

offers more equipment-specific training, but also introductory and advanced courses, and modular training. In Greece, modular training or advanced courses seem to be prevalent, although introductory courses are also available. In Portugal, there are more modular training or equipment-specific training opportunities, although introductory courses are also available. In Slovakia, most PD initiatives in this area are equipment-specific, followed by modular training. Most PD initiatives in these five countries refer to equipment-specific training, modular training, or introductory courses about ICT and media tools (e.g. e-portfolio) or educational applications of ICT and media (e.g. interactive learning, ICT-based educational application for mathematics).

Table 7 - Types of PD initiatives related to ICT use and media education in ECE settings in Bulgaria, Germany, Greece, Portugal, and Slovakia.

	Types of PD initiatives related to ICT use and media education in ECE settings						
Country	Introductory courses	Advanced courses	Equipment -specific training	Modular training	Massive Open Online Courses (national language)	Webinars	Communities of practice focusing on ICT and media education
Bulgaria	✔	✔	✔	✔		✔	
Germany	✔	✔	✔	✔			
Greece	✔	✔		✔	✔	✔	✔
Portugal	✔	✔		✔	✔	✔	✔
Slovakia	✔			✔			

In sum, types of PD initiatives related to ICT use and media education in ECE settings in Bulgaria, Germany, Greece, Portugal, and Slovakia are diversified (Table 7) and distinct from other levels of teacher training. There are frequent introductory courses (e.g. ICT in the learning process, ICT-based applications, or media tools, Web 2.0 tools, Programming and critical thinking). Bulgaria, Germany, Greece, and Portugal provide advanced courses in media education or use of ICT and applications in education. There are also other types of PD programmes related to equipment-specific training (e.g. use of whiteboard, Scratch, Alfík, BIfF interface), MOOCs, webinars, and participation in communities of practice with a special focus on ICT use and media education (e.g. eTwinning). In all five countries, teachers are required to receive continuing professional development through accredited training entities to advance their careers.

The mandatory training time needed for career advancement varies across countries (from 16 to 100 hours). There are pre-defined specific areas for continuing PD and ICT use or media education and these are part of the proposed professional training topics (e.g. ICT use and media education; ICT applied to teaching and school management; safe and secure environment for the Internet; ICT and media tools). However, teachers can select the topics for their PD. In the case of PD for ECE teachers, there is not always a governmental recommendation for training topics. However, there are government indications that recognize the importance of ICT use and media education in all countries, except Slovakia.

PROFESSIONAL DEVELOPMENT APPROACHES FOCUSING ON ICT USE AND MEDIA EDUCATION IN ECE SUMMARY

1. In all five countries there are national PD initiatives on ICT and media education, sometimes funded by the government.
2. PD initiatives vary widely. In Bulgaria, Portugal, and Greece PD delivered by public entities is more frequent. In Germany and Slovakia, PD is delivered mainly by private entities.
3. Main types of PD initiatives include introductory courses in Bulgaria; advanced courses and modular training in Greece; equipment-specific training in Germany; and equipment-specific and modular training in Portugal and Slovakia.
4. In Bulgaria, Greece, Portugal, and Slovakia, PD focuses on the use of technology in an educational context; however, in Germany, PD focuses on media education.
5. The duration of the training varies by country, usually between 3 and 50 hours.
6. Teachers are required to receive PD through accredited training to advance their careers (except in 4 Länder in Germany).
7. The mandatory PD time for career advancement varies across countries, from 16 to 100 hours.
8. There are pre-defined specific areas for continuing PD and ICT use or media education and these are part of the proposed topics.
9. Teachers can select the topics for their PD.
10. There are government indications that recognize the importance of ICT use and media education in all countries, except Slovakia.

Relevant local, regional, and national initiatives

National and European policies are influential factors in ECE educational practices aimed at enriching the learning environment. Technology and interactive media are here to stay and several policy frameworks have been developed for digital and online learning (Shapiro et al., 2016). Also, teacher characteristics such as vision and objectives, curriculum, available time, pedagogical, technological and content skills, ICT and pedagogical resources, ICT resources at home, as well as the vision and support of parents and families can influence the development of pedagogical activities in ECE.

ICT and media create learning opportunities for collaborative inquiry, peer assessment, project development, use of e-portfolios and media productions, which may enhance the development of critical thinking, communication, progressive self-directed learning, and the development of digital literacy (Fraillon, Schulz, Friedman, Ainley, & Gebhardt, 2015). Below, we present some promising practices relevant to the use of ICT and media education in ECE.

Table 8 - Promising practices related to ICT use and media education in ECE settings.

Country	Promising practice	Relevance	Goals	Age group	Target group	Entities involved
Germany	Medienkompetenz-Kitas NRW	Developed and tested over one and a half years with 12 centres. These institutions qualified for media literacy day-care centres (Medienkompetenz-Kitas). Specially trained media coaches went to the facilities. Complete day-care teams received six months of further training in "media literacy" directly on site."[42]	To support the process of continuing media education in the pedagogical context of educators in North Rhine-Westphalia, carried out by the LfM.	Children aged 3 to 5.	Children, parents, and ECE institutions and teachers.	Landesanstalt für Medien NRW.
Germany	Medienführerschein Bayern	Teacher training in media literacy - basics, media in everyday life, media heroes, advertising. Modules contain a theoretical part, charts, templates, examples that can be used by teachers, and links for further information.	"Strengthening media competence in all age groups is the aim of the "Bavarian Media Driving Licence" (Medienführerschein Bayern). It offers free online materials with suggestions for pedagogical practice."[43] The main objective is to provide a reference network of educational media in Bavaria, with materials and certification for children and adolescents.	Children, adolescents and adults.	Children, adolescents and teachers.	Media license Bavaria
Germany	Media 4 Kids	The offer is aimed at institutions especially in rural areas. Local project.	To provide ECE teachers with information and practical examples on how to use media.	Children (3 years and older),	Teachers	E&G Projekt Agentur GmbH.

[42] **Source:** http://lfmpublikationen.lfm-nrw.de/index.php?view=product_detail&product_id=339.
[43] **Source:** https://www.medienfuehrerschein.bayern/

Country	Promising practice	Relevance	Goals	Age group	Target group	Entities involved
Portugal	25+um Media education activities (Pereira, Pereira, & Tomé, 2015)	Reflection about Media education (information search, selection, and evaluation) and example of activities.	To provide different actors a set of 'ideas' to put media education into practice in their contexts, adapting and recreating them and creating new experiences.	Children (up to 3 years old), adolescents and adults.	Pre-school students to higher education.	University
Portugal	Media Education Guidance (Pereira et al., 2014)	Set of proposals for the development of pedagogical actions on media in preschool education (e.g. activities).	To propose a frame of reference for the pedagogical work on media education issues in ECE and primary and secondary schooling.	Children (up to 3 years old) and adolescents (until 18 years old).	Children, adolescents and teachers.	Ministry of Education
Portugal	Learning with the school library (Conde, Mendinhos, Correia, & Martins, 2012)	Network of School Libraries that stimulates, among others, digital literacy. Presents activities of promotion of media literacies for several levels of education, including ECE.	To develop literacies essential to learning and to associate reading, the use of ICT, different media and research in curricular or extracurricular learning situations, through the school library/ teacher activities.	Children (up to 3 years old) and adolescents (until 18 years old).	Children, adolescents and teachers.	Ministry of Education, Office of the Network of School Libraries
Portugal	"Tell us a story!" Contest	Example of a suggestion for ICT integration in preschool), namely digital audio and video recording technologies.	Creation of projects developed by preschool and primary school that encourage the use of ICT, namely digital audio and video recording technologies.	Children (aged 3 to 10).	Preschool and Primary school children.	Ministry of Education, Office of the Network of School Libraries, and National Reading Plan 2027
Bulgaria	Play and Talk with Echo	The innovative curriculum on which children work is "Play and Talk with Echo" by Arts Publishers, provides children with the opportunity to acquire foreign language training and using modern interactive theologies.	The use of modern interactive technologies in learning of lexis and whole grammar structures in the English language in preschool groups, kindergartens and schools.	Young Children (aged 3 to 10).	Children, parents and ECE teachers.	All kindergartens of the city of Burgas.

In addition to the examples presented in Table 8, there are reports of other promising practices in Greece, namely in private education settings, in English language training (ELT) with young learners, using online platforms for practicing languages. Also, in Slovakia, a project for the Mediation of Safer Internet Use stands out[44], despite targeting older children (9 to 18 years), which revealed an increase in children's awareness of online risks (Tomková, 2012).

The promotion of innovative practices that use ICT and media education both as an objective and as a means for new learning for children in ECE is increasing in many countries, as recommended by UNESCO (e.g.Kalaš, 2012). It is important, therefore, to make available to educational communities examples of innovative practices that illustrate the advantages and risks associated with the use of these resources so that educators, parents, and policymakers can make decisions that promote children's development, regardless of geographic, social, economic, or cultural background.

[44] **Source:** https://www.zodpovedne.sk/index.php/sk/component/jdownloads/finish/3-prieskumy-a-vyskumy/29-mediacia-bezpecneho-pouzivania-internetu?Itemid=0

Relevant European and International projects

ICT assumes a ubiquitous presence in the environment around children. Therefore, it is important to promote children's media and digital literacy from an early age. There is support and interest across the whole education sector in Europe for the development and integration of ICT into education policies, curricula, and practices. However, there is also consensus around the idea that the introduction and use of ICT in ECE should be grounded in a clear understanding of the purposes, practices, and social contexts of ECE.

There is growing recognition of the many ways that ICT can contribute to or transform the activities, roles, and relationships experienced by children and adults in ECE settings. According to the British Educational Communications and Technology Agency (BECTA) and the UK Foundation Stage, it is important that children identify the uses of everyday technology and that children have opportunities to use ICT to support their learning processes (BECTA, 2004).

European and international institutions (e.g. European Union, OECD) have recognized the importance of media education for lifelong learning[45]. As young people are becoming more and more consumers and producers of media, education systems

[45] Directive 2007/65/EC of the European Parliament and of the Council of 11 December 2007; the Commission Recommendation of 20 August 2009; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A European approach to media literacy in the digital environment; Recommendation 1466 (2000) of the Parliamentary Assembly of the Council of Europe and the Grünwald Declaration on Media Education (UNESCO, 1982).

need to provide tools, such as knowledge and skills for well-informed consumption and responsible media use.

Media education is a relevant topic on the EU agenda (e.g. Council of the European Union, 2016; Hartai, 2014). There is easy access to research and policies in Europe about media education (e.g. Bulger, Oxford Internet Institute, & Livingstone, 2013). However, there is less research and fewer policy recommendations regarding ICT and media education (Hartai, 2014) in ECE settings.

In a comparative study on media literacy policies in Europe (Frau-Meigs, Flores, Tort, & Velez, 2014), different realities were reported. The following results stand out: an approach to media education in national curricula and policies is a reality in few European countries; in countries where this topic is addressed, it tends to be used across the curriculum; there has been an increase in the number of countries with policies related to education for the media in the last decade; however, there are difficulties in the operationalization of media-related concepts in the school context, due to the lack of studies on school media practices.

According to Hartai (2014), 66% of 27 European countries refer to media literacy, with a trend towards a cross-cutting approach in 18 of these countries. The reference to media literacy is not always accompanied by educational policies that support it. Teacher training in media literacy is provided in 44% of the countries, while 81% of the countries provide training in ICT in education. In Europe, there is a tendency for media literacy to become available increasingly early. However, due to the lack of

stricter regulations, media education is at the mercy of individual teachers' ambition (or lack of ambition) across Europe (Hartai, 2014).

In an investigation aiming to map media literacy practices and actions in EU-28, Chapman and Insights (2016) identified media literacy skills transversal to the different countries: creativity, critical thinking, intercultural dialogue, media use, and participation and interaction. Further, they found that most projects associated with media literacy in Europe develop and make available resources as the product of their work. Also, members of the EU Kids Online Network have worked on media literacy, within a COST Action (Livingstone et al., 2017), with research results expected soon.

There are emerging trends and good practices in the development of media literacy in Europe and across the world with international projects and initiatives that promote the use of ICT and media education:

Table 9 - Relevant European and International projects.

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organization
Global Kids Online	International research project	Generate cross-national evidence on children's internet use by creating a global network of researchers and experts. Develop a research toolkit to enable academics, governments, civil society, and others to carry out research with children and parents on the opportunities, risks, and protective factors of children's internet use.	Children	Researchers and experts in children's use of the internet.	Since 2015	Collaborative initiative between the UNICEF Office of Research - Innocenti, the London School of Economics and Political Science (LSE), and the EU Kids Online network. Supported by the WeProtect Global Alliance (2015 – 2016).
Toddlers and Tablets: Exploring the risks and benefits 0-5 face online	United Kingdom and Australia	Investigate family practices, and attitudes regarding young children's tablet use in Australia and the UK. To develop recommendations for policymakers and offer guidelines for parents.	Children between 0 to 5 years old.	Children and families.	2015-2018	Funded by the Australian Research Council as part of the Discovery Projects scheme. Involves collaboration between Edith Cowen University, the LSE and the Dublin Institute for Technology.
Net Children Go Mobile	Denmark, Italy, Romania, and the United Kingdom	Provide robust and comparable data on children and mobile internet in Denmark, Italy, Romania, and the UK.	Children between 9 and 16 years old.	Children, parents, educators and researchers.	2012-2014	Co-funded by Safer Internet Programmemer.
Literacia Mediática. Portal de Educação para os media [Media Literacy. Education Portal]	Portugal	Media education resources for children, parents, educators and researchers.	Across ages.	Children, parents, educators and researchers.	Since 2010	

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organization
Media Smart	Portugal	To provide children with tools to understand and interpret advertising and prepare them to make informed choices.	Children aged 7-11.	Teachers and parents.	Since 2008	Non-profit literacy program for advertising in various media. Sponsored by industry and supported by the Portuguese Government.
Segura Net	Portugal	Promote safe, critical and informed browsing of the Internet and mobile devices in the education community.	Children aged 3 – 12.	Children, adolescents, parents, teachers and community.	Since 2004	Directorate-General for Education. Part of the public-private consortium Centro Internet Segura, in partnership with the Foundation for Science and Technology, the Portuguese Institute of Sports and Youth, the Portugal Telecom Foundation, and Microsoft Portugal. Under the European Commission's Connecting Europe Facility.
European Association for Viewers Interests	International non-profit organization registered in Brussels.	Provide resources for teaching and learning across levels and advocate for media literacy and full citizenship.	Children, adolescents and adults.	Teachers and students.		Supported by Council of Europe, United Nations Alliance of Civilizations, Europe for citizens programmer, UNESCO, and European Audio-visual Observatory.
Cine y Educación	Spain	Promotion of education and cinema in a pedagogical context.	Children, adolescents and adults.	Teachers and students.	Since 2003	Author: Enrique Martínez-Salanova Sánchez
Edutopia	USA	Acquisition and application of	Children between 2	Parents and teachers.	Since 1991	Supported by The George

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organization
		knowledge, attitudes, and skills needed to thrive in school, work, and life in the 21st century.	and 18 years old.			Lucas Educational Foundation.
Miúdos Seguros na Net	Portugal	Promote the safe use of the Internet. Raise awareness about the dangers associated with the use of the Internet.	Children and adolescents.	Children, adolescents, parents, teachers.	Since 1999	Funded by the European Commission.
Digilitey	European network	Develop an interdisciplinary network to synthesize existing research and identify knowledge gaps. Help avoid duplication, foster innovative avenues for future research.	Children between 3 and 8 years old and adults.	Children, families, teachers and researchers.	Since 2013	Funded by the European Union's Horizon 2020 research and innovation programmer.
eSafety	Australian	To help children have safe, positive experiences online.	Children, adolescents and adults.	Children, adolescents, parents, researchers, teachers.	Since 2007	Australian Government.
Canada's Media Smarts for the Digital and Media Literacy	Canada	Provide leadership in digital advancement and literacy in schools, homes, and communities.	Children and adolescents.	Children, adolescents, parents, teachers.	Since 1994	Not-for-profit organization for digital and media literacy. Support from private companies and organizations (e.g. Facebook).
MediaLab	Portugal	Introduction to programming in a playful and creative way within ECE activities.	Children aged 3-5.	Children, teachers and researchers.	Since 2015	Supported by Foundation for Science and Technology.
European School net	European Network	To support European ministries of education, schools, teachers, and stakeholders in the transformation of education processes for the 21st century.	Children, adolescents and adults.	Students, teachers and researchers.	Since 1997	Supported by European Union.
Cybersmarts	Africa	Research-based strategy of positive empowerment fostering 21st century	Children aged 3 – 18.	Children and adolescents.	Since 2006	Support from international entities including Microsoft and

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organization
		skills and the use of Digital Divide.				Macmillan/ McGraw-Hill.
Netsafe	New Zealand	Maximize opportunities available through technology by providing practical tools, support, and advice for managing online challenges.	Children and adults.	Children', parents and teachers.	Since 1998	Independent, non-profit online safety organization.
Future Classroom Lab	European Network	Help visualize how classrooms and other learning spaces can be reorganized to support changes in teaching and learning.	Children and adolescents.	Children, teachers, parents and researchers.	Since 2012	Supported by European School Net.
Creative Classrooms Lab	European Network	Produce learning scenarios, activities, guidelines, and make recommendations to help policymakers and schools make informed decisions on optimal strategies for implementing 1:1 initiatives in schools and for the effective integration of teaching and learning.	Children and adolescents.	Children, teachers, parents and researchers.	2013-2015	Supported by European School Net.
Transmedia Literacy	International project	Developing transmedia skills and informal learning strategies to improve formal education.	Teens (12-18 years old).	Adolescents, teachers and researchers.	Since 2015	Supported by Horizon 2020 – Research and Innovation actions.
Kiitos @ 21st Century Preschools	International project	Promoting an integrated pedagogical approach to preschool education, promoting early learning of a 2nd language, music education, and skills for the 21st century.	Children aged 3 – 6.	Children, teachers and parents.	2014-2015	Supported by Erasmus + and the European Union.
DATEC Project - Developmentally Appropriate Technology for Early Childhood (Siraj-	European context	Development of common agreements regarding the constitution of an appropriate ICT educational curriculum for the present and for the future of young	Children aged 0 – 8.	Children, teachers and researchers.	1999-2001	

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organization
Blatchford & Siraj-Blatchford, 2006; Siraj-Blatchford & Whitebread, 2003)		children throughout Europe.				
European Media Literacy Education Study (EMEDUS)	European Union	To promote studies on media education across countries, including national curricula across EU27 and analysis of media education teachers' resources, skills, competences, and relevance.	Adults	Researchers, Policymakers and professionals in audio-visuals.	2012 - 2014	Supported by United Nations and UNESCO.
Creative Europe	European Commission's	Programs for supporting culture and audio-visuals, helping distribute films across Europe and promoting film festivals.	Adults	Researchers, Policymakers and professionals in audio-visuals.	Since 2007	European Commission.
UNESCO-UNAOC UNITWIN on Media and Information Literacy and Intercultural Dialogue	International	Promoting the reflection and development of Media and Information Literacy and Intercultural Dialogue.	Adults	Researchers, Policymakers and professionals in audio-visuals	Since 2009	UNESCO and UNAOC.

Best practice examples and available resources

Technological tools have potential for enhancing communication, collaboration, and social networking (OECD, 2009). It is important for children to be able to use ICT and media to obtain and share relevant information, demonstrating themselves capable of understanding aspects of the message (e.g. point of view, potential intention) and using media and ICT in a creative way, considering the purpose of the activity (Hobbs, 2010, p.19). However, using ICT and media education requires goal definition and

planning methods, materials, and assessments (NCUDL, 2014). It is, therefore, important to provide guidance to ECE teachers about the use of technology and interactive media in ways that optimize opportunities for young children's cognitive, social, emotional, physical, and language development.

According to recommendations from the European Association for Viewers' Interests (2009) and the information gathered on the state-of-the-art of ICT use and media education in Europe, European countries have developed policies for the promotion of media literacy, seeking to promote a full and active European citizenship. In some countries, there is a media regulatory authority that remits the monitoring and enhancement of media literacy and the promotion of good practices. There is also the integration of media education in educational curricula as a specific goal and cross-curricular subject.

Likewise, ECE has sought to develop media literacy activities that stimulate democratic culture and shared values, as advocated by Lunt and Livingstone (2012). Some advances have been made in ECE and in promoting the use of ICT and media in this context, but more needs to be done. Next, we present some promising practices associated with ICT use in ECE settings, media education of young children, and/or media competency of ECE professionals.

As presented in Table 10, examples of best practices in media education address the processes suggested by Buckingham (2003): "best practices in media education involve combination of hands-on creative production and critical reflection, which seeks to

build on students' existing interests and experience of media" (p. 112). In this context, access to technology and technical support for its use, as well as familiarization with cultural forms of expression and communication with media should be explored.

Table 10 - Best practices examples and resources in ICT use and media education.

Project	Countries	Goal(s)	Age groups	Target groups	Years	Type of organisation
EUkidsOnline	European network	Multinational research network. Seeks to enhance knowledge on European children's online opportunities, risks, and safety. Uses multiple methods to map children's and parents' internet experience, in dialogue with national and European policy stakeholders.	Children	Children	Since 2006	Funded by the EC's Better Internet for Kids programme.
Better internet for kids	European network	Empower citizens to use the Internet, mobile phones, and other online technologies, positively, safely, and effectively.	Children aged 3 – 12.	Children, families, teachers and researchers.	Since 2008	Supported by European Union. Involved other projects: INSAFE and INHOPE.
Mediataitokoulu	Finland	Promotion of education for literacy.	Children over age 3.	Children, teachers and researchers.		Supported by European Union.
ERASMUS+ Project: Mini-maker	Germany	Promotion of media education activities in kindergarten and elementary education; examples of activities.	Children aged 3 -10.	Kindergarten and primary school context.		ERASMUS + Project supported by European Union.
Project "Me Ki - Medienkindergarten"	Austria	Providing information on media literacy, media practice (print, audio, pictures, TV, internet, mobiles, etc.), and media projects, including theoretical information and examples on how to use media in preschools.	Children aged 3 – 6.	Kindergarten and primary school context.		
CLEMI	France	Promotion of Media Education and Information.	Children aged 3 – 15.	Children, teachers and families.	Since 1982	French Ministry of Education.
Common Sense Media	USA	Helping kids thrive in a world of media and technology.	Children aged 2 -18.	Parents, advocates and teachers.	Since 2003	Independent non-profit organization.
Discovermedialiteracy	USA	Promote digital and media literacy education and present resources to teachers and parents.	Children aged 3 – 12.	Children, teachers, parents, and researchers.		Supported by The Bye school Foundation

PART 5 - EUROPEAN OPPORTUNITIES AND CHALLENGES ASSOCIATED WITH ICT USE AND MEDIA EDUCATION IN ECE

In this section, based on input from Kit@ partners, we discuss European opportunities and challenges or risks associated with ICT use and media education in ECE.

Europe recognizes the importance of ICT use and media education in ECE (e.g. Akvile et al., 2014; Byrne et al., 2016; European Commission, 2011, 2018; Livingstone et al., 2017; OECD, 2016b; Ponte et al., 2018). Increases in funding for the development of European projects promoting media education and pedagogical use of ICT by young children and ECE professionals (e.g. Erasmus + projects) are visible (Bulger et al., 2013; Chaudron et al., 2015; Chaudron et al., 2018; Eder & Roboom, 2016; EU Kids Online, 2014; Expert Group on Media Literacy, n/d; Frau-Meigs et al., 2014; Holloway et al., 2013b; Kultusministerkonferenz, 2017; Kumpulainen, 2017; Livingstone, Mascheroni et al., 2015). Also, national, and local entities (e.g. Municipalities, associations) have increased funding for the purchase of ICT resources in schools (Chapman & Insights, 2016; European Commission/EACEA/Eurydice, 2016a, 2018; DG Communications Networks, 2013; Durando, 2017; Livingstone et al., 2012; Shapiro et al., 2016).

Needs and challenges related to ICT use and media education in European ECE

NEEDS

- **Policy orientations regarding ICT use and media education in ECE, which translate into educational guidelines** (e.g. Chapman & Insights, 2016; Chaudron, Di Gioia, & Gemo, 2018; Hartai, 2014; Livingstone, Mascheroni, & Staksrud, 2017; O'Neill, Livingstone, & McLaughlin, 2011; Shapiro, Østergaard, & Roccaro, 2016). Some European countries have laws or educational guidelines that support the integration of ICT in the school context, emphasizing predominantly an integrated and transversal vision of ICT use. However, this is not a reality in all European countries.
- **Strategies to promote family involvement in ECE and media education initiatives targeting families** (e.g. Brito et al., 2017; Bulger et al., 2013; Chaudron et al., 2018; Ólafsson et al., 2013). This need stems from the social pressure for the early acquisition of ICT resources within families and their difficulties in mediating the use of ICT and media.
- **Investments in ECE projects related to media education** (Gabinete de Comunicación, European Association for Viewers' Interests (EAVI), The Centre de Liaison de l'Enseignement et des Médias d'Information (CLEMI), & Université Catholique de Louvain à Louvain (UCL), 2009; Livingstone et al., 2017). Investments in ECE projects are still reduced, compared to other education levels. There is still a need to increase the quantity and quality of services that support the use of ICT in ECE contexts. It seems, therefore, relevant

to increase national and international studies and pedagogical interventions on the use of ICT in ECE.

- **Promote ICT and media education professional development opportunities for ECE teachers** (Chaudron et al., 2018; DG Communications Networks, 2013; Lee, 2016; Oliveira & Caetano, 2017; Shapiro et al., 2016), acknowledging that the use of ICT in ECE contexts is increasingly less resource-centred and more associated with the changes needed in pedagogical planning and the role of teachers. Media education, especially in ECE, is still recent in many European countries. ICT and media use should be more represented in ECE teacher training courses. There is still a limited number of ECTS dedicated to ICT in initial teacher education and almost none related to media education.
- **Supporting parents and ECE teachers in mediation processes** (e.g. Brito et al., 2017; Dias et al., 2016; Lieberman, Bates, & So, 2009).
- **Supporting safety and risk reduction in digital media use by young children** (e.g. European Commission, 2016; Livingstone et al., 2012).

CHALLENGES

- **Limited time to explore ICT and media in ECE** (DG Communications Networks, 2013).
- **Sometimes, few resources or resources in bad conditions** (e.g.OECD, 2017a). Lack of (adequate) resources to explore ICT and media in ECE settings is a relevant issue.
- **Continuous ICT and media transformation** (European Commission, 2016; Hartai, 2014), requiring continuous updates in teacher knowledge and skills, hence, frequent teacher training.

- **Diversity in children´s ICT and media competences** (Hartai, 2014; Livingstone et al., 2011; Mascheroni et al., 2016).
- **Teachers providing ICT and media education even if they are not from the "Native digital generation".** Teachers who currently work with young children have low levels of ICT competencies.

The country teams involved in this project also reported the need for: (a) more educational, ethical, and legal guidelines; (b) more examples of practices; and (c) more strategies to promote family involvement in ECE, especially in countries where they are still inexistent (e.g. Slovakia, Bulgaria). Also, in Bulgaria, Germany, Greece, Portugal, and Slovakia, there is a common view that ECE teachers lack ICT and media education training to successfully carry out the media education process (Araújo et al., 2018; Bozhkova & Dobrev, 2018; Papaioannou, 2018; Robert et al., 2018; Sklenka & Strazik, 2018).

Opportunities and potentialities related to ICT use and media education in European ECE

In the European ECE context, several **potentialities and opportunities** for the use of ICT and media education with children between the ages of 3 and 6 are recognized:

- **ICT and media afford opportunities to support and enhance children's learning**, development (e.g. cognitive, social, and emotional), and play experiences.
- **ICT and media facilitate the use of multiliteracies** through words, pictures, and sounds, providing a range of ways for children to communicate their ideas, thoughts, and feelings.
- **ICT and media may encourage creativity**, collaboration and co-operative skills, discussion, problem solving, self-directed exploration, risk taking, and flexible thinking.
- **ICT and media may support acceptance** of children from diverse cultural, socioeconomic or language backgrounds as well as children with special learning needs (e.g. assistive / adapted ICTs can reduce barriers).
- **ICT and media may strengthen school-community relationships**, including (a) relationships between children and adults (with the exploration of children's interests and ways of thinking that enable more adult-supported learning through collaboration and communication); and (b) relationships between teachers and the family (promoting sharing, discussion, and co-construction of pedagogical activities inside and outside the classroom).

- **ICT and media may support and strengthen practitioners' professional communities** of learning and development among teachers.
- **Universities and pedagogical institutions are providing various courses regarding ICT and media**, online and face-to-face, targeting in-service teachers, and most often those in the public sector.
- The next generation of teachers will have **specific training in the use of ICT and media in education**.
- There are more funded programmes with **European partnerships** and European funding for ICT training, mostly based on accredited programmes.
- There are more and more seminars or Master's programmes in ICT at **low cost.**
- **Global connections, with lower access costs.**
- Increasingly, **more online resources** on how to use ICT and media education are becoming available.
- Information Technology Industry and companies are developing more and **more educational applications**.

EUROPEAN OPPORTUNITIES AND CHALLENGES ASSOCIATED WITH ICT USE AND MEDIA EDUCATION IN ECE SUMMARY

European governments' initiatives

- Allocation of funding for the development of projects across European countries, supporting partnerships.
- Prioritizing ICT and media related topics in ECE, recognizing that media and ICT can enrich children's learning, in articulation with other educational areas.
- Encouragement of change in national curricula and design of guidelines for supporting ICT use and media education.
- Increasing the offer of teacher training opportunities to support the growing number of professional learning communities.

European challenges

- Limited time to explore ICT and media in ECE.
- Sometimes, few resources or resources in bad conditions.
- Continuous ICT and media transformation.
- Diversity in children´s ICT and media competences.
- Teachers providing ICT and media education even though they are not "digital natives".

European opportunities

- Improvements in accessing ICT resources and the internet.
- Teachers have more training in the use of ICT than in the past.
- Teachers and families recognize the importance of the use of ICT in educational contexts. They are more familiar with technologies.

European needs

- Policy orientations regarding ICT and media education in ECE.
- More strategies to promote family involvement in ECE (namely in Slovakia and Bulgaria).
- Investments in projects for ECE.
- Promoting training for ECE teachers.

PART 6 – RECOMMENDATIONS

In this section, we present our recommendations regarding ICT use and media education in ECE, based on the analysis of the state-of-the-art Media Education in ECE presented in this report, with a special focus on the five target countries. These include aspects that should be considered when planning, implementing, and evaluating pedagogical activities involving children between the ages of 3 and 6, particularly by ECE teachers, but also potentially by families and other educational agents.

Proposal for a Quality Educational Model for ICT use and Media Education in ECE

Based on our analysis of the state-of-art ICT use and media education in ECE, particularly in Europe, we propose a quality educational model which integrates important dimensions that practitioners and policymakers should consider in planning, implementing, and evaluating activities with children between 3-6 years old.

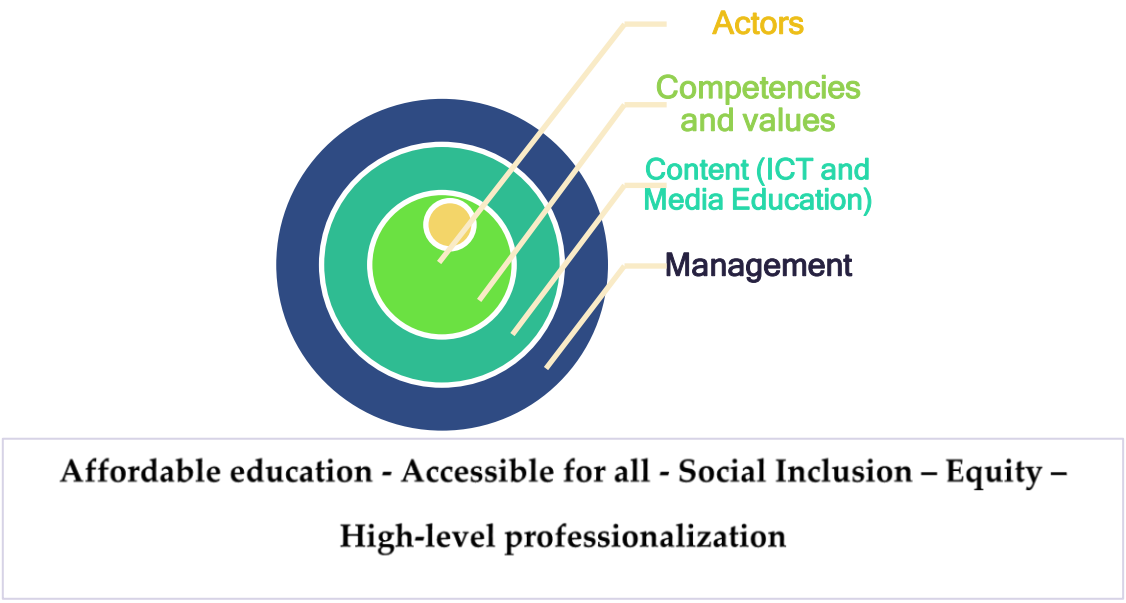

Figure 6 – Proposal for a Quality Education Model for ICT and Media Education in Europe.

This model is composed of four dimensions:

1) **Actors** – participants who are part of or have the power to influence the educational community (e.g. school principals, municipalities). Actors must be active participants and have a voice in decisions, namely those aiming to promote a positive climate and develop partnerships.
2) **Competences and values** – includes individual knowledge, motivation, attitudes, and beliefs. Competences and values include critical thinking and inquiring, communication, collaboration, problem solving, creativity and cultural/social understanding. For ECE teachers, knowledge should integrate pedagogical, technological, and content knowledge.

3) **Content** – includes the set of skills and knowledge that should be acquired and mobilized by individuals (e.g.21st Century learning expectations). ICT and media education content includes information and data literacy (e.g. selecting information), digital content creation (e.g. innovation), safe use of technologies, and problem solving using technologies.
4) **Management** – the ability to formulate goals, plan, implement, evaluate, and disseminate ECE practices in accordance with objectives, while considering the needs and interests of the actors and contexts involved. It requires intentionality, adequacy of methods, resources, and procedures as well as information sharing systems among stakeholders.

Recommendations

Based on international agency guidelines, research findings, and the information collected by the partners in their country reports, we analysed ECE practices and educational policies for media and ICT education with children between 3-6 years across Europe, with a special focus on the five participating countries. Informed by theory and available empirical evidence, we propose recommendations that integrate the role of the different educational actors in the process of education for ICT and media use in ECE. We include recommendations regarding competences and values (and attitudes), contents, and management in ECE.

What should teachers do with children regarding ICT use and media education?

Teachers can use ICT and media education to promote children's attitudes, values, and competences. Regarding **attitudes and values**, teachers should aim to promote:

- Active participation and citizenship (e.g. voice, knowing and listening);
- Belonging (cultural and local);
- Respect for diversity and social inclusion (cultural sensitive - recognition of shared values and differences);
- Initiative.

Regarding **competences**, teachers should aim to promote:

- Collaboration and cooperation skills;
- Creativity;
- Critical and reflective thinking;
- Problem-solving skills.

According to recommendations for ECE and media education, to promote these attitudes, values, and competencies, teachers should consider the following:

- Activities should reflect the pedagogical vision of professionals and families regarding objectives and expected outcomes.
- Educational practices should build on systematic updates of teachers' knowledge about the subject and context of implementation, for example through continuing vocational training throughout their professional career.

- Promote a positive environment within the educational community, based on partnerships and educational management processes that involve coordination, supervision, and participation of all educational actors (e.g. teachers, parents, children).

To this effect, the following stages of **planning activities in ECE** should be considered:

Goal definition

- Understand and build on the perspectives of children, valuing their opinion (e.g. give voice to the child).
- Identify interests and competences of children through the observation of their behaviour.
- Support children's ability to express their ideas clearly (in their maternal language, if applicable).
- Stimulate emerging learning and children's questioning (e.g. inquiring, reflection).
- Provide access to information and discovery of facts by children.

Material and context

- Select activities and resources intentionally, making sure they are meaningful, appropriate, effective for supporting and enriching children's learning and development and play experiences.
- Organize the group in a diversified way, including small and large group dialogue.

Process

- Guide children's activities (e.g. setting goals).
- Support learning through play (e.g. organization of times, spaces, and materials).
- Involve parents, with benefits for children's learning.

Further, in **planning ICT use and media education activities with children in ECE settings**, teachers should consider the following:

- Promote the transversal and cross-cutting use of ICT and media.
- Ensure transparent use of ICT so that children understand what is expected.
- Encourage creation, exploration, and critical thinking about media and ICT use.
- Plan purposeful uses of ICT and media that consider pedagogical goals.
- Promote activities where children experience media and media content with all their senses (e.g. visual, auditory, kinaesthetic).
- Facilitate the use of multiliteracies through words, pictures, and sounds, providing a range of ways for children to communicate their ideas, thoughts, and feelings.
- Promote awareness actions on media, including media analysis, evaluation, and creation activities.
- Give children control over the interaction with ICT and media (e.g. construction of digital storytelling).

- Use ICT to support children from diverse cultural, socioeconomic, or language backgrounds, including children with special learning needs (e.g. assistive / adaptive ICT).
- Use ICT and media to share the achievements and productions of children;
- Respect legislation regarding children's online exposure and respect the children's right to privacy.
- Promote children's diversified media experiences (e.g. allow for experiences with different media types).
- Promote children's talks about media and media experiences to understand concepts about technology media (e.g. differences between information, stories, and ads).
- Enable children to select the media they intend to use and explore it, according to their interests and objectives.
- Produce media work exploring creative use and processing of media (e.g. produce a video where children tell a story and exhibit drawings).
- Promote activities that explore the concept and role of media in their different aspects and gradually translate their complexity, which is not limited to working with ICTs or the media, but involves processes of observation, analysis, understanding, and evaluation of the message presented and/or produced (e.g. talking about media, promoting processing media experiences, understanding and critically reflecting on media messages).
- Encourage children to ask for help or to question adults in the exploration of media and ICT resources.

- Use media creatively regarding children´s expression of their ideas and opinions.
- Make children aware of behaviours they should or should not have online (e.g. sharing personal data, accepting unsolicited requests in games).

What should teachers do with families regarding ICT use and media education?

- Develop synergies that promote a global and healthy development of the child (including discussion of mediation strategies for ICT use and media at home), which can be facilitated by access to ICT and media.
- Help parents develop active mediation strategies of ICT and media content exposure (e.g. practices such as talking about internet content and online activities, sitting nearby while the child is online and actively sharing the child's online experiences; activities and recommendations aimed at promoting safer and responsible uses of the internet).
- Use ICT and media to strengthen school-community relationships (e.g. communication, decisions.
- Use ICT and media tools to reduce the distance between families, teachers and the educational community (e.g. Blog, wiki, Facebook page).
- Listen to families about the activities they intend to develop with ICT and media.
- Collect authorization for the collection of images, videos, or sound during activities and for their dissemination.

- Explore concepts such as net etiquette and how to protect the child and family from harmful situations.
- Discuss with parents the minimum ages of access to social networks and/or digital games.
- Help parents learn about online child safety, identify and avoid media content that is dangerous or inappropriate, and adopt positive online behaviours.
- Promote parental awareness of data security behaviours in the family (e.g. family registration on a YouTube channel).
- Promote awareness of media literacy and its social importance.
- Encourage family processes of observation, analysis, understanding, and evaluation of the media message presented and/or produced (e.g. talking about media, processing media experiences, understanding and critically reflecting on media messages) and inform them about the possible media impact on children´s perception of the world around them.

What should teachers do with educational teams regarding ICT use and media education?

- Develop a plan to promote teachers' skills related to media literacy and media education.
- Become involved in local, national, or international communities that allow the sharing and evaluation of ICT use and media education practices to continuously support activities developed with children (e.g. community of practice).
- Support and strengthen practitioners' professional communities of learning (e.g. network communities).
- Promote media technological use according to individual and community needs and interests (e.g. access or share content).
- Exemplify and promote positive attitudes related to digital media.
- Establish methods for sharing, discussing, and co-constructing pedagogical activities among teachers, families, and the rest of the educational community.
- Help the educational community learn how to take actions for promoting online child safety.
- Promote the discussion of the social role of media literacy in the lives of children and families.
- Encourage teachers' processes of observation, analysis, understanding, and evaluation of the media message presented and/or produced (e.g. talking about media, processing media experiences, understanding and critically reflecting

on media messages) and inform them about the possible media impact on children's perceptions of the world around them.

- Use ICT and media to promote communication and expression among the various actors of the educational community (e.g. parents, directors, counsellors, researchers).

What are the features of adequate professional development initiatives regarding ICT use and media education in ECE?

- Ensure there is a consistent underlying framework related to media literacy, encompassing what media education entails and how it can be operationalized.
- Address relevant media concepts such as forms of communication and collaboration; type of media (e.g. entertainment, advertising) and intention (e.g. information, persuasion); type of content (news, advertising, games); audience; etc;
- Discuss the skills needed for proficient use of media, such as skills for the 21st century.
- Explore resources that facilitate media content building such as tutorials for image, sound, or video editing. Some examples of how to explore media education are available from Hobbs (2017)[46].

[46] See also https://createtolearn.online/for-student/

- Provide enough time for debates on teacher attitudes, beliefs, questions, and concerns regarding the implementation of media education activities. Relatedly, ensure joint discussions regarding possible solutions to problems presented by teachers.
- Address media ethics and relevant human rights, such as freedom of speech and information, safety and digital security (including internet technology risks related to content and contact risks; consumer-related risks related to online marketing, over-spending, and fraudulent transactions; privacy and security risks). Consider ethics and risks related to the production and publication of content, identifying resources that are potentially dangerous to pedagogical practices. Address internet skills such as erasing records, changing privacy settings, and finding safe information (by comparing information between different websites or changing filter preferences).
- Discuss digital resources suitable for young children, considering their relevance, quality, gaps, consensus, or disagreements.
- Address how to build guidelines for the use of media by children and professionals in ECE settings.
- Address digital content and networking opportunities available for teachers, which focus on communication and collaboration (e.g. blog, networking platforms).
- Explore ways to foster partnership relationships within the educational community (e. g., theme days, building school blogs or groups).
- Provide media education guidelines and examples of media procedures and resources useful in the process of media education.

- Demonstrate how to explore information and data literacy (e.g. provide examples of media created by students and instructors, share assignments and lesson plans, examples of videos, blogs and websites, podcasts, screencasts, infographics, animations).
- Exemplify the various stages of implementation of media education activities with young children, from goal definition and task design to implementation, assessment, and evaluation. To this effect, explore diverse media assessment scales (e.g. Buckingham, 2014) and share experiences.
- Explore forms of digital content creation, by producing media messages. This may include exploring problem-solving using media to improve the quality of the teaching process in ECE. Address how media may make it possible to publicize fundraising initiatives to acquire material or fund field trips or to support the sales of student work produced for that specific purpose.

What should national and European policymakers do regarding ICT use and media education in ECE?

- Continue funding and promoting partnerships between national and international entities, associations, universities, etc.
- Encourage the development of projects for sharing resources between professionals.
- Ensure sufficient professional training opportunities regarding the use of ICT and media education in ECE settings, considering both initial (i.e. pre-service) and continuous training of teachers.
- Encourage the development of resource guides in ECE about ICT and media education.
- Promote opportunities for families to be more involved in children's education (e.g. possibility of absence from work without loss of remuneration).
- Promote the use of media as a means of defending social rights, interests, and responsibilities in educational communities.
- Promote informed choices about the different forms and contents of media, considering their cultural and institutional diversity.

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