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European Early Childhood Education and Care (ECEC) Working Group

Peer Learning Activity

Positive impact, opportunities and challenges of digitalisation in ECEC

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SUMMARY

Questions related to this PLA can be addressed to
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To support Member States in implementing the 2019 Council recommendation on high-quality early childhood education and care (ECEC) systems and the European Quality Framework for ECEC, the European Education Area Working Group (WG) on ECEC works towards identifying best practices and ideas that can support efficient reforms. Through meetings and peer learning activities, members of the Working Group support each other in understanding the challenges of providing quality ECEC to all children and identifying solutions and resources to address these challenges.

In a context where digitalisation is gaining ground in all aspects of society, ECEC decisionmakers and practitioners also need to consider how this is impacting the sector. This peer learning activity (PLA), jointly organised by the European Commission and the Slovenian Ministry of Education, considered the research findings identified by the Organisation for Economic Co-operation and Development (OECD) in its report Empowering Young Children in the Digital Age and explored four topics and guiding questions related to digitalisation in ECEC:

Topic	Guiding question
Guidelines, legislations and regulations	What systematic approaches are used at the national / regional level in your country in relation to digitalisation and ECEC (legislation guidelines, regulations)?
Workforce – staff initial training and continuing professional development	How can initial and in-service institutions (providers) equip and support preschool teachers with essential digital pedagogy and competences?
Curriculum framework and pedagogy	How can curriculum development and pedagogical strategies empower children in becoming responsible, creative and active citizens in a digital world?
Future impact, benefits and challenges of digitalisation in ECEC	What are the main positive impacts, benefits and challenges of the digitalisation in the ECEC?

The PLA featured various presentations of strategies, policies, tools as well as questions and challenges from the hosts and Working Group members to promote peer learning. It also provided space for interactive panel and smaller group discussions in different formats to allow for sharing knowledge and experiences. Discussions focused on centre-based provision of ECEC, and the full ECEC age range was covered – from birth to the start of primary schooling. Participants were encouraged to reflect on the policy and practical implications gathered during the PLA to support their own policy development and the development of the agreed outputs of the WG. The PLA also provided all participants with the opportunity to visit ECEC centres in Ljubljana, Koper and Škofja Loka. Kindergarten staff and pedagogues from the Faculties of Education presented activities and the results of projects aimed at enhancing digital competences and computational thinking appropriate for the developmental level of children enrolled in ECEC.

Guidelines, legislations and regulations related to digitalisation in ECEC

Across Europe, countries are responding to digitalisation in ECEC in various ways, including legislation, guidelines, and regulations. As noted by the 2023 OECD report on "Empowering Young Children in the Digital Age", several countries focus on risk management, such as privacy protection and healthy technology use, but opportunities to prepare young children for the digital age are less explored. While the safe and responsible use of technology is promoted, guidelines and regulations are often incomplete or inconsistent, resulting in variable practices. Only a minority of countries have comprehensive frameworks or safety-by-design standards for digital service providers targeting young children.

In this regard, two in-depth country cases were presented, including Slovenia's Digital Education Action Plan 2021-2027 as well as the Finnish approach to digitalisation in ECEC. Participants also discussed about the approaches taken in their contexts to digitalisation in ECEC, and the aspects that could be improved.

Discussions during the PLA have also confirmed that countries differ in their approaches to digitalisation in ECEC, and that only a few of them have concrete legislation / regulations in this regard. Key challenges remain around the safe use and limited research evidence on digitalisation in ECEC; and the lack of systematic, ECEC-specific frameworks and practical guidance on digitalisation. There is a need for balanced, ECEC-specific frameworks that protect children while enabling pedagogical innovation and practical use of digital tools, supported by stronger research on their impact.

ECEC workforce – Equipping staff with essential digital pedagogy and competences

Staff are central to building high-quality ECEC systems, and digitally competent educators are essential for supporting children and families in navigating the opportunities and risks of the digital world. Case studies from the Slovenian Ministry of Education, three Slovenian universities, Portugal, as well as Lower Saxony, Germany, were shared to showcase how the ECEC workforce is equipped with essential digital pedagogy and competences. In addition, the Erasmus+ GREELCO project – an online community connecting ECEC professionals and offering them the opportunity to improve their digital competencies, share their expertise and reflect on their practice – was also presented, and the Slovenian Kindergarten Jelka provided feedback on the SELFIEforTeachers for ECEC tool.

While certain countries include digital competencies in initial teacher education, discussions highlighted that systematic training and ongoing professional development in digital pedagogy for pre-school teachers is lacking. Where training exists, it is often fragmented, optional, or dependent on local providers, leading to inequalities in coverage and quality. There is limited systematic monitoring of teachers' digital skills, and funding for digitalisation and professional development is inconsistent. There is a strong need for a common understanding of digitalisation, comprehensive training programmes addressing different levels of digital competence, and practical guidance embedded in national curricula. Ongoing professional learning, technical assistance, and resources are also needed to empower staff and reduce administrative burdens.

Curriculum frameworks and pedagogies

Curriculum frameworks and pedagogies are evolving to address the challenges and opportunities of digitalisation in ECEC. Eurydice reports that nearly three quarters of European countries now include digital competences in their ECEC curricula, with information literacy and digital content creation among the most prominent areas. However, several countries lack specific goals for early digital literacy in their curriculum frameworks. According to OECD, most existing curricula promote play-based approaches, with project-based and collaborative pedagogies being less common, especially for the youngest children. Supporting digital literacy does not always require direct screen use; unplugged activities and experiential learning are effective and encouraged. The OECD recommends setting clear, comprehensive goals and adopting broad, age-appropriate strategies to help young children thrive in the digital age, with a focus on reducing digital divides. The PLA explored various pedagogical practices related to digitalisation in ECEC, with two country cases from Slovenia and Lithuania.

The discussion highlighted significant variation across Europe in how ECEC curricula address digital competences and computational thinking. Some countries include these explicitly, providing methodological resources and training, while others embed them only broadly/implicitly. Approaches to digital competences vary, some being left to the discretion of individual settings or teachers, with limited national vision or systematic support. Digital skills are taught through both "plugged" and "unplugged" activities, and certain countries are updating curricula to strengthen continuity from ECEC to primary education. However, challenges remain, including the risk of formalising ECEC – potentially undermining the play-based approach that is central to the field, lack of common terminology, and limited evidence on the impact of digital competences in ECEC, with concerns about technology use for the youngest children. Solutions proposed include adopting a whole-school approach, providing ECEC staff with training and clear guidance on emerging topics, fostering child-centred pedagogy, involving children's voices, and ensuring leadership support.

Future impact, benefits and challenges of digitalisation in ECEC

To explore this topic, a presentation was provided on ethical considerations around digitalisation in ECEC, and a set of panellists from Slovenia discussed the related opportunities and challenges. It was noted that a participatory and meaningful use of technology involves both children and teachers in decision-making, professional cooperation, and reflection. In addition, the panel highlighted that the value and purpose of digital competences need to be clarified and communicated to children, families, and educators. Digital education in ECEC should address the needs of children, families, ECEC staff and settings, and other key stakeholders, with the aim of preparing children for the future by fostering critical thinking, problem-solving, and various forms of literacy. Creating learning communities and promoting good practice examples can support the meaningful integration of digital education. It is key to ensure that lessons learned from projects are recorded and incorporated into the subsequent projects. Early and thoughtful engagement with emerging technologies, including AI, should be ethical and purposeful, supported by open, scientifically upgraded, and flexible curricula. Key challenges that persist include fear and misconceptions about digital tools, ethical and privacy concerns, slow systemic change of education systems, and gaps in knowledge and access. Addressing these requires training, collaboration across institutions, sustainable funding, and efforts to shift mindsets among educators and parents. Ultimately, digital tools should complement play-based learning and holistic child development, with ECEC professionals acting as role models for meaningful and age-appropriate technology use.

Key messages and conclusions on the impact of digitalisation in ECEC

PLA participants were invited to reflect on digitalisation's impact on the ECEC system as a whole, on children, and on ECEC professionals. The outcomes of these discussions highlighted both the transformative potential and the complex challenges of digitalisation in ECEC. Additional insights on how digitalisation can impact parents emerged from the discussions.

On the ECEC system as a whole

- Digitalisation offers opportunities to improve data collection, monitoring, and quality assurance, and to facilitate communication and collaboration across all levels of governance and between ECEC staff and families. It enables more active participation in decision-making and supports professional development.
- However, participants noted persistent challenges, including concerns about data safety, privacy, and the quality of digital infrastructure. The rapid pace of technological change often outpaces policy and practice, and there is a need for clearer definitions, leadership, and

continuity in digitalisation efforts. Financial constraints and the risk of technology-driven decisions, rather than needs-based policy, were also identified as ongoing issues.
- Moving forward, participants stressed the importance of developing safe, accessible digital platforms, building multidisciplinary expertise, and ensuring that digitalisation is guided by a clear purpose and adds genuine value to the system.

On children

- When used thoughtfully, digital tools can motivate learning, foster computational and critical thinking skills, and support inclusion, particularly for children with special needs. Digital education in ECEC can prepare children for the realities of a digital world and offer new experiences.
- Nevertheless, participants raised concerns about the risks of overuse, screen addiction, and unequal access, which can lead to exclusion and negatively affect cognitive and social development.
- It was noted that well-designed digitalisation strategies in ECEC should focus on preparing children for a digital world through developmentally appropriate, largely unplugged methods. These approaches should intentionally aim to strengthen critical thinking, build early computational thinking skills, and introduce concepts of digital safety, without relying on screen-based tools.
- The importance of safeguarding children's privacy and ensuring age-appropriate, meaningful use of technology was emphasised. Participants agreed that adults (educators, parents, and caregivers) must be supported to guide children effectively, and that children's participation and voice should be considered in digitalisation efforts. Regulations and practices must protect children's rights, well-being, and unplugged activities should remain a core part of early learning.

On ECEC professionals

- Digitalisation has the potential to reduce administrative burdens, facilitate resource sharing, and inspire new approaches to teaching, learning and documenting child's progress. It may support systematic planning, professional development, and enhanced communication with parents.
- At the same time, professionals face increased bureaucracy, demands on time, and exposure to potential misuse and privacy risks. There is a need for training, clear guidance, and support to build confidence and digital competence among staff. Mindsets towards technology vary, and effective communication with families can be challenging.
- Participants highlighted the importance of providing safe and useful digital tools, protecting staff privacy, and creating opportunities for reflection and sharing successful practices. Keeping up with technological developments and maintaining a clear focus on the educational purpose of digitalisation remain ongoing priorities.

On families

- Digitalisation influences how parents engage with their children's learning and wellbeing – for instance by affecting how families communicate with ECEC settings, how they support children's digital habits at home, and how children are exposed to digital tools or screen time. In this context, early childhood professionals can play an important role to build a shared understanding with families of how young children encounter digitalisation, acknowledging both its educational potential and its risks, such as excessive screen-time, privacy concerns and the influence of online content. While digital tools can strengthen communication between ECEC settings and parents, we should also be aware that sensitive issues often require personal, face-to-face conversations.

- A recurring emphasis is the need to connect children's digital experiences at home with pedagogical intentions in the ECEC setting, which requires insight into how families use technology in everyday life, for example through joint workshops, shared digital resources or suggestions for home-based exploration.

In summary, participants agreed that digitalisation in ECEC must be approached with caution, clarity, and a commitment to quality and inclusivity. Systems should strive for balanced frameworks that protect children and enable innovation, professionals need ongoing support and training. Children's holistic development and active participation should remain central, with curricula promoting foundational digital skills such as critical thinking and problem solving, delivered primarily through developmentally appropriate unplugged activities. Collaboration, evidence-based practice, and thoughtful integration of digital tools will be essential for building sustainable, high-quality ECEC systems in the digital age.