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# Target state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education

Department for Early Childhood Education, Comprehensive School Education and Liberal Adult Education

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Department for Early Childhood Education, Comprehensive School Education and Liberal Adult Education

Ministry of Education and Culture Helsinki 2023

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**Abstract**

A description of the target state of digital transformation in early childhood education and care, pre-primary, primary and lower secondary education is completed in autumn 2023. The description is drawn up as part of the 'Framework for Digitalisation in Early Childhood Education and Care, Comprehensive School Education and Liberal Adult Education' project, which develops the guidance, direction and effectiveness of digitalisation and the anticipation capacity of the Ministry's administrative branch.

The description makes concrete the objectives set out in Finland's Digital Compass, Policies for the digitalisation of education and training until 2027, and other significant documents defining how digitalisation should be carried out in the sector from the perspective of early childhood education and care and pre-primary, primary and lower secondary education. Digitalisation is examined through seven areas: preconditions for digitalisation development, digital competence, support for developing digital infrastructure, services and interoperability, data management and quality, data protection and information security, digitalisation-related legislation and legal interpretation, and digitalisation research.

The objectives of digitalisation are described in the context of early childhood education and care, pre-primary, primary and lower secondary education. This should enable all those involved in the education and training sector to carry out long-term, proactive and strategically guided work to achieve the desired outcomes. A description of the nationally defined and shared outcomes will help the parties to come up with concrete measures, advancing digital transformation towards the sector's shared target state.



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| **Keywords** | education, digitalisation, early childhood education and care, pre-primary education, primary and lower secondary education |

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# Varhaiskasvatuksen, esi- ja perusopetuksen digitalisaation tavoitetila


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**Tiivistelmä**

Varhaiskasvatuksen, esi- ja perusopetuksen digitalisaation tavoitetilan kuvaus valmistuu syksyllä 2023 osana Varhaiskasvatuksen, esi- ja perusopetuksen sekä vapaan sivistystyön digitalisaation viitekehys -hanketta. Hankkeessa kehitetään digitalisaation ohjausta ja vaikuttavuutta sekä hallinnonalan ennakointikykyä.

Tavoitetilan kuvauksella konkretisoidaan Suomen digitaalisen kompassin, Kasvatuksen ja koulutuksen digitalisaation linjausten 2027 sekä muiden merkittävien toimialan digitalisaatiota määrittelevien asiakirjojen asettamia tavoitteita varhaiskasvatuksen, esi- ja perusopetuksen näkökulmasta. Digitalisaatiota tarkastellaan seitsemän osa-alueen kautta: digitalisaation kehittämisen edellytykset, digitaalinen osaaminen, digitaalisen infrastruktuurin, palveluiden ja yhteentoimivuuden kehittämisen tuki, tiedonhallinta ja laatu, tietosuoja ja -turva, digitalisaation lainsäädäntö ja -tulkinta sekä digitalisaation tutkimus.

Digitalisaation tavoitteet kuvataan varhaiskasvatuksen, esi- ja perusopetuksen kontekstissa.Tällöin kaikki kasvatus- ja koulutustoimijat voivat tehdä pitkäjänteistä, ennakoivaa ja strategisesti ohjattua työtä tavoitetilan toteutumiseksi. Kansallisesti määritellyn ja yhteisesti jaetun tavoitetilan kuvaaminen mahdollistaa konkreettisten toimenpiteiden muodostamisen, mikä edistää toimialan digitalisaation kehitystä kohti yhteisesti jaettua tavoitetilaa.



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# Målbild för digitaliseringen av småbarnspedagogiken, förskoleundervisningen och den grundläggande utbildningen


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**Referat**

Beskrivningen av målbilden för digitaliseringen av småbarnspedagogiken, förskoleundervisningen och den grundläggande utbildningen blir klar hösten 2023 som en del av projektet för en referensram för digitaliseringen av småbarnspedagogiken, förskoleundervisningen och den grundläggande utbildningen. I projektet utvecklas styrningen och effekterna av digitalisering samt förvaltningsområdets förmåga till förutseende.

Genom beskrivningen av målbilden konkretiseras de mål som ställs upp av Finlands digitala kompass, riktlinjerna för digitaliseringen av fostran och utbildning 2027 samt andra betydande dokument som definierar digitalisering inom sektorn för småbarnspedagogikens, förskoleundervisningens och den grundläggande utbildningens del. Digitaliseringen granskas genom sju delområden: förutsättningar för utveckling av digitaliseringen, digital kompetens, stöd för utveckling av digital infrastruktur, tjänster och interoperabilitet, informationshantering och kvalitet, dataskydd och datasäkerhet, lagstiftning och -tolkning gällande digitalisering samt forskning om digitalisering.

Målen för digitaliseringen beskrivs i småbarnspedagogikens, förskoleundervisningens och den grundläggande utbildningens kontext. Då kan alla aktörer inom fostran och utbildning arbeta långsiktigt, förutseende och strategiskt för att förverkliga målbilden. Beskrivning av en nationellt definierad och gemensam målbild gör det möjligt att utforma konkreta åtgärder, vilket främjar utvecklingen av digitaliseringen inom sektorn mot den gemensamma målbilden.



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# Contents

# PREFACE

The aim of the project Framework for Digitalisation in Early Childhood Education and Care, Comprehensive School Education and Liberal Adult Education, initiated by the Ministry of Education and Culture in 2022, is to define the principles, target state and measures guiding the development of digitalisation in education and training in cooperation between the Ministry of Education and Culture, the Finnish National Agency for Education and the sector. The framework project will develop foresight and clarify the division of tasks and objectives, as well as the means of achieving them in the sector. It will also create a management model for the development of different areas of digitalisation in the coming years.

Reports of the National Audit Office (2019, 2020) have identified a need to develop digitalisation guidance in general education. Digitalisation has made strong progress in the education sector, but the overall picture of the needs of the various operators and the ongoing developments has remained incomplete. In addition, the development work has been patchy and inconsistent. While many research projects, such as Comprehensive Schools in the Digital Age I and II, DigiVOO and ICILS, have also successfully brought forward many useful findings, they have only been addressed in individual projects and government terms. In the framework project a national view of the ongoing development paths, needs and challenges is created and conditions to continue work on a long-term basis are enabled.

The target state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education presented herein is part of the work on the framework project and one of its foundation pillars. The description of the target state creates an important foundation for future development work by showing the direction in which all operators in education and training can aim in their development work. A corresponding description of the target state for digitalisation will also be prepared for liberal adult education in 2024.

The launch of the work on the framework for digitalisation and the description of the target state were supported by several directors and experts from various organisations. We wish to thank Eeva-Riitta Pirhonen, Erja Vitikka, Mervi Eskelinen, Jenni Nuutinen and Marja Penttilä at the Ministry of Education and Culture, and Paula Merikko, Jarkko Niiranen, Erja Nokkanen, Jyrki Tuohela, Mikko Honkanen, Miia

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In addition, we would like to thank the stakeholders who took the time to comment on draft versions of the text. We also extend warm thanks to the members of the network of digitalisation networks in pre-primary, primary and lower secondary education and to the experts on digitalisation in early childhood education and care, pre-primary and primary education from 'active municipalities': Annika Ekblad, Carolina Lassus, Elina Helin, Elina Uusi-puro, Hanna Katajarinne, Hanna-Maria Partanen, Jaakko Aaltonen, Janne Korsimo, Jari Harvio, Jarno Bruun, Jenni Valanne, Matti Kähkönen, Miika Miinin, Minna Taatila, Paula Vorne, Sampo Forsström, Sanna Partanen, Sarianna Tapaila, Sirkka Helisten and Thomas Södergård, as well as Annamari Koskiniemi from the IT Center for Science (CSC), who facilitated the group.

# 1 Introduction

Digitalisation in education and teaching is steered at several levels: internationally, nationally at the level of the Government and the regional administration, as well as in the different fields of education. From an international perspective, the European Union (EU) is the most significant entity steering digitalisation in the sector. The EU Digital Education Action Plan (2021–2027) sets out a common vision of high-quality, inclusive and accessible digital education in Europe, and aims to support the adaptation of the education and training systems of Member States to the digital age. The Digital Education Action Plan enables the promotion of both the objectives of the Europe's Digital Decade: digital targets for 2030 programme and the European Digital Rights and Principles published in 2023. Digitalisation in education and training, especially from the perspective of competence, is also guided by the European DigComp Framework, which is the digital competence framework for citizens, and the DigCompEdu Framework, which is aimed at teachers.

The Ministry of Finance is responsible for general digitalisation steering at national level. During Prime Minister Marin's term, a Ministerial Working Group on Developing the Digital Transformation, the Data Economy and Public Administration was set up to guide the development of digitalisation and information policy, technology policy and the data economy and to coordinate related development projects and the situational picture. To support the work of the ministerial working group, a coordination group for digitalisation was established in the administrative branch of the Ministry of Finance in October 2021 to form a coherent entity and a shared situational picture of digitalisation and data economy development activities. Under the guidance of the group, Finland's Digital Compass based on the EU's Digital Decade programme was completed in the autumn of 2022. Furthermore, the contents of the Digital Compass are in line with the Policies for the digitalisation of education and training until 2027 published by the Ministry of Education and Culture in April 2023. The ministry's policies guide the entire sector but do not take a stand on development targets for different educational levels or sectors.

According to the rules of procedure of the Ministry of Education and Culture, the tasks related to digitalisation in education and teaching are the responsibility of the departments. In addition to the data economy and digitalisation capabilities,

digitalisation in education and teaching is strongly linked to the objectives of growing into active citizens, where the understanding of the digital operating environment and society, as well as the related skills and competences, are among the key parts of the wider concept referred to as digitalisation. Digitalisation supports the objectives set out in the Act on Early Childhood Education and Care (540/2018, section 3) and the Basic Education Act (628/1998, section 2), such as supporting the growth of the child, increasing knowledge and skills, and promoting education and equality.

The implementation of digitalisation complies with the provisions on equality of the Constitution (section 6) and the aforementioned acts. In addition to these, each government sets goals for its term that are implemented through development projects or programmes.

The Framework for Digitalisation in Early Childhood Education and Care, Comprehensive School Education and Liberal Adult Education is a project of the Ministry of Education and Culture to develop the steering and effectiveness of digitalisation and the foresight capacity of the administrative branch. The framework defines the principles, target state and measures guiding the cooperative development work of the Ministry of Education and Culture, the Finnish National Agency for Education and the sector for different areas of digitalisation, which include preconditions for the development of digitalisation, digital competence, support for the development of digital infrastructure, services and interoperability, data management and quality, data protection and information security, digitalisation-related legislation and legal interpretation, as well as research on digitalisation. Measures have been prepared in all areas for the years 2023–2027. This description of the target state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education is also being completed as part of the project.

The purpose of the description of the target state is to give concrete expression to the objectives set by the Finnish Digital Compass, the 'Policies for the digitalisation of education and training until 2027' and other significant documents defining the digitalisation of the sector from the perspective of early childhood education and care, pre-primary, primary and lower secondary education. In addition, a more detailed and visual description will be prepared separately. It will examine the necessary measures from the perspectives of various parties: national operators, providers of early childhood education, pre-primary, primary and lower secondary education, staff, children and young people, community/guardians, developers and researchers.

At the moment, the state of digitalisation in the sector varies in terms of competence, services and knowledge. The target state describes the objectives for digitalisation in the context of early childhood education and care, pre-primary, primary and lower secondary education to enable the various operators to carry out long-term, proactive and strategically guided work to achieve the target state.

The aim of the work carried out within the framework is to form a common direction for the development of digitalisation in education and teaching, to promote the equal implementation of digital learning and to strengthen digital competence in a transversal manner, to create common rules and operating models for the development of digital services, to develop a high-quality interoperable knowledge base and analytics utilising it to support decision-making, and to develop the appropriate allocation of resources. The national strategic steering will result in concrete measures that promote the development of digitalisation towards a shared target state in the sector.

## 1.1 What is digitalisation in early childhood education and care, pre-primary, primary and lower secondary education?

There is no single definition of digitalisation, and it can be seen as an umbrella term covering efforts to digitise, digitalise, conduct a digital transformation or otherwise promote the development of organisations, services or functions through the use of digital technology. In change management digitalisation also plays a role, and then the aim is to change the process or part of it through digital services or systems, so that the service or system in question can be used to manage and process information or to deal with authorities.

Chapter 5 'A nation of knowledge and competence' of the Government Programme A strong and committed Finland calls for better use of the opportunities offered by artificial intelligence (AI) and digitalisation (p. 88):

> *"The opportunities offered by artificial intelligence and digitalisation will be better taken into account in developing the education system. The opportunities offered by digitalisation will also be used to reduce administrative work. Leadership in the education and culture sector will be improved."*

In early childhood education and care, pre-primary, primary and lower secondary education, digitalisation has diversified learning opportunities. The Government Programme also seeks to ensure the availability of high-quality printed and digital teaching material. Various applications and services that support learning and adapt to the learner's situation offer new opportunities. Used in the right place and at the right time, gamification also increases the learning motivation of children and young people. Digital aids, such as screen readers, dictation software and customisable user interfaces, increase accessibility and equality. At the same time, the protection of children and young people's privacy when using various digital services and the safe use of digital devices require special attention. There are also many drawbacks associated with the increasingly digital society, such as cyberbullying, grooming and the power of algorithms to narrow our worldview, which must be addressed in early childhood education and care, pre-primary, primary and lower secondary education.

For the personnel in the sector, digitalisation has meant having to learning a lot of new things. They now have access to a wide range of digital teaching materials to support the planning and execution of their work. Digital textbooks, articles, videos and interactive applications have become part of their daily routines. Digitalisation has also made it easier for staff to partake in continuing education – even through virtual study tours – and share good practices in their networks. Although the progress of digitalisation has made many areas of work more agile, much work is still needed to ensure that digital competence and development opportunities are nationally on an equal level. In addition, staff need training to learn how to utilise digital technologies and software in ways that support learning and wellbeing. Attitudes to digitalisation can also hinder the learning of new skills or the introduction and use of digital services.

Digitalisation has made for more effective cooperation between operational units and guardians. Digital platforms facilitate regular communication and sharing of information about children and young people's learning progress, daily activities and upcoming events.

At the level of administration, knowledge-based management has evolved in the sector. Decisions can be targeted at large entities, such as the planning of service networks or the allocation of personnel resources, based on knowledge. In the future, better quality data will allow for better foresight.

Early childhood education and care, pre-primary, primary and lower secondary education have made significant leaps in national knowledge base development in recent years, such as the Varda database on early childhood education and care

(Varda), which collects the information needed for national planning and guidance work in early childhood education and care, or the KOSKI National Registry and Data Transfer Service for Study Rights and Completed Studies of the Finnish National Agency for Education. In the future, one key question in the development of information production will be what information is needed and how the information is utilised in the guidance of providers of early childhood education and care, pre-primary, primary and lower secondary education to safeguard the rights of children and young people.

Operating in an increasingly digital society requires digital Bildung, which encompasses both education and culture. According to Finland's Digital Compass (p. 35):

> *"Digital Bildung requires knowledge and skills, participation opportunities and capabilities to play an active role and express oneself creatively and safely in the digital world. – – Digital Bildung also encompasses knowledge, judgment and empathy. – – Digital Bildung relies on a strong education system. "*

Early childhood education and care, pre-primary, primary and lower secondary education lay the foundations for digital Bildung. The digital creativity and inclusion of children and young people are developed as an accumulating continuum. At the same time, social responsibility, understanding diversity and ensuring wellbeing and safety are built into the activities of early childhood education and care, pre-primary, primary and lower secondary education.

The objectives of digitalisation in the sector must take into account the competence of education and teaching staff, including the need for pedagogical competence, in relation to the use of digital technology in education. The increasingly digital world not only offers many opportunities for children and young people, but also places demands on them. The competence and skills to be mastered include practical digital skills and personal production, security and responsibility perspectives, information management, inquiry-based and creative work, and interaction.

Digital competence can strengthen the digital wellbeing of children and young people. In the current operating environment, with the influx of misinformation and disinformation, the importance of media literacy is emphasised not only at the level of individuals, but also from the perspectives of societal resilience and democratisation. Media literacy is the ability to interpret and evaluate, produce media content and operate in media environments. AI literacy, cybersecurity and a fair data economy, as well as the need to examine the currency of contents and objectives of teaching from these perspectives, have emerged as new dimensions in the discussion. In addition, programming competence is a key module

taught in education and teaching, which includes diverse thinking skills and an understanding of the digital, programmed world and how it works, as well as what can be achieved through programming.

In accordance with the principles of sustainable development, the aim of societal changes, such as digitalisation, must be to enable a good life for the current and future generations. Decision-making and operations consider the environment, people and economy in equal measure. One topical aspect of social sustainability is the wellbeing of children and young people. The DigiVOO research project commissioned by the Ministry of Education and Culture investigated the impact of digitalisation on learning situations, learning and learning outcomes in lower secondary schools nationwide. According to the interim report of the research project, approximately 14% of lower secondary school pupils felt anxious about using digital devices. Indeed, the first result publication of the project states that it is essential to discover the causes of the anxiety, stress and nervousness associated with the use of digital devices, so that young people can be supported and learning environments developed in the best possible way.

Digitalisation in itself is also one of the megatrends. The concept of 'megatrend' aims to express the wide-ranging influence of a particular technology, culture or process on the functioning of society to the extent that the public administration should react to it by means of regulation, resourcing or education policy. Digitalisation also has identifiable subsets, which are often colloquially referred to as megatrends. These topical megatrends concerning early childhood education and care, pre-primary, primary and lower secondary education include the use of machine learning methods in various AI applications based on language models, virtual reality and the increasing use of analytics applications. On the other hand, the consideration of ethics and sustainable and responsible development, as well as data protection and information security, in the promotion of digitalisation and the development of its solutions are also among the topical megatrends.

Digitalisation in education and teaching is also linked to wider developments, such as climate change mitigation, population development, the shrinking of the school network and the tightening financial situation. Inequality in learning is another key theme to consider. Equality and equity affect digitalisation in education and teaching, its prerequisites, local objectives and practical implementation opportunities. The development of digitalisation must support the objectives and strategic guidance of education and training, not to control them.

## 1.2 Structure of the description of the target state

The target state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education is described through seven areas:

1. **Preconditions for digitalisation development**
   The task is to form and manage an overall picture of digitalisation in the sector. The focus is on finding and utilising common operating models. In addition, the observation of changes in emerging technologies and the identification and management of development needs play a major role. The activities are strongly targeted at providers of early childhood education and care, pre-primary, primary and lower secondary education.
2. **Digital competence**
   The task is to promote digital competence in a transversal manner across different operators and levels of the sector. With the realisation of the tasks, digital competence develops as a uniform learning path. Enabling the equality of competence development guides the implementation of the tasks of the work package.
3. **Support for the development of digital infrastructure, services and interoperability**
   The task is to promote digital infrastructure and services towards a functional and safe entity that creates a foundation for the development of competence in education and teaching. The focus is on national rules and principles aimed at ensuring the interoperability of digital services and solutions.
4. **Data management and quality**
   The task is to develop data utilisation processes, people's awareness of the existing data and the prerequisites for data management. The focus is on the smooth flow of data, and the problem areas that currently hinder it are mapped out and solved through surveys, data models and the construction of guidance and support services.
5. **Data protection and information security**
   The task is to identify and develop assignements related to data protection and information security in the sector, develop cooperation, find common data protection and information security operating models for education and training operators, and promote the sharing of good practices.
6. **Digitalisation-related legislation and legal interpretation**
   The task is to support providers of early childhood education and care, pre-primary, primary and lower secondary education in

the performance of statutory digitalisation-related tasks and to identify development tasks related to digitalisation legislation or its enforcement. The tasks promote the uniform implementation of statutory tasks and strengthen the related management.

7. **Digitalisation research**
   The task is to promote research and knowledge-based development in the digitalisation of education and teaching. The aim of the tasks is to enable and strengthen the evaluation of the impact of digitalisation and to produce scientific data as a basis for decision-making in different administrative branches.

**The following chapter follows the same structure under each heading:**

1. Inputs provided by the 'Policies for the digitalisation of education and training until 2027' for the area in early childhood education and care, pre-primary, primary and lowersecondary education.
2. Description of the challenges in the current state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education.
3. Description of the core target state of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education related to the area.
4. Key tasks to achieve the digitalisation target state in the area of early childhood education and care, pre-primary, primary and lower secondary education.

The key tasks serve as a bridge to the next output related to the target state, where each of the mentioned key tasks is addressed from the perspectives of different actors, such as state operators, education providers, staff, children and young people, parents/guardians, developers and researchers.

# 2 Digitalisation target state by area

## 2.1 Preconditions for digitalisation development

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of the preconditions for digitalisation development:

- Determine the target state and common direction of digitalisation in education and teaching.
- Develop and promote digitalisation in cooperation.
- Promote learning and competence development through digitalisation.

At the moment, there is no national situational picture of digitalisation in the sector. A common understanding of the situation is needed in order to better grasp where development should be directed and focused when resources are limited. This will also enable mirroring the situations and needs of providers of early childhood education and care, pre-primary, primary and lower secondary education against the situational picture. In the current state, education providers have to perform various tasks related to digitalisation on their own and look for the right solutions for major changes and development disruptions, such as the topical issue of artificial intelligence. Equality is limited by the fact that typically only large operators are able to participate in development, whereas smaller actors often lack similar opportunities – thus the next challenge may be, for example, the 'AI gap.' The current activities that maintain inequality cannot be allowed to continue, and instead inequality must be prevented through cooperation and better allocation of resources, enabling everyone to keep up with digitalisation development. In order for digitalisation to improve everyone's learning and for the equality of children and young people in digitalisation to become a reality, the actual situation of providers of early childhood education and care, pre-primary, primary and lower secondary education must be taken into account, along with the needs and preconditions for the development of activities.

In the target state, the development of digitalisation in early childhood education and care, pre-primary, primary and lower secondary education is systematic and based on previous work, results and their sharing, a continuously maintained situational picture, high-quality data and co-creation. A common management model for the digitalisation of the sector is in use. With common rules, recommendations and certificates, providers of early childhood education

and care, pre-primary, primary and lower secondary education are not left alone as digitalisation progresses. Automation has reduced the burden of repetitive and overlapping tasks, which improves the daily life of small operators in particular. Collaboration abounds in networks that operate on the principles of openness and sharing. Cooperation and development related to digitalisation are based on the principles of sustainable development. Ethical consideration is also a natural part of all the development of digitalisation in education and teaching.

Key tasks:

- Maintain the digitalisation situational picture for the administrative branch, target state updates and communication
- Determine digitalisation development needs and conduct network cooperation
- Harmonise tasks related to the implementation of digitalisation
- Foster digitalisation in accordance with the principles of sustainable development
- Issue recommendations on the use of AI
- Report on the certification system for digital services and contents used in early childhood education and care, pre-primary, primary and lower secondary education
- Strengthen procurement expertise in digital services and equipment.

## 2.2 Digital competence

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of digital competence:

- Develop everyone's digital competence.
- Ensure that digital competence covers the entire learning path and is constantly being accumulated.
- Emphasise equality in opportunities for competence development.
- Draw up descriptions of the digital competence of the staff, maintain existing descriptions of the competence of children and young people, and follow up on all of them.
- Provide consistent and systematic education and training.
- Facilitate knowledge-based management through the development of competence.

In the current situation, the digital competence[1] of children and young people varies greatly and is not being developed on an equal basis for all. Some are anxious about using technology, while others reach the top level in international comparisons. The digital competence of children and young people has not developed in accordance with the current criteria of the early childhood education plan or the national core curricula for pre-primary, primary and lower secondary education. In terms of personnel, taking advantage of the opportunities offered by digitalisation is being slowed down by the challenge of scaling. There is no separate subject of digital competence taught in Finland. Instead, digital competence, including media literacy as part of multi-literacy and ICT competence, is a transversal competence area that should be included in the teaching of all subjects. Digital competence is also included in all areas of learning as a transversal competence in early childhood education and care. In this case, the teaching of digital skills is the responsibility of all education and teaching staff. However, the degree programmes of education and teaching staff vary greatly in how much digital skills they teach, and students completing higher education qualifications have found their studies insufficient, for example in terms of media education. The current continuing education system is also inadequate in a situation where there are great differences in skill between staff and where the pace of technological development has accelerated – which also applies to competence needs in administration and management. In addition, a change is needed in the teaching of digital skills and pedagogical practices, as current thinking is often tool-oriented. It should be required that every child and young person be guaranteed equal capacity to learn and apply digital skills.

1 The definition of digital competence is constantly changing with the development of society. Different skills are needed at different stages of life. What is key is the readiness and ability to operate in the digital operating environment in which the individual lives at any given moment. Competence is a combination of knowledge, skills and attitudes. Digital skills can be taught and learned, and the skills accumulated in the process form digital competence. The European DigComp Framework defines *digital competency* as the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It comprises five areas – information and data literacy, communication and collaboration, digital content creation, safety and problem-solving – and constitutes one of the eight key competences for lifelong learning of the Council recommendations. In Finland, descriptions of digital competence have been created for early childhood education and care, pre-primary, primary and lower secondary education, forming the national digital competence framework to support the implementation of curricula. For education and teaching staff, drawing up national descriptions is one of the measures leading to the target state. The descriptions are updated on regular basis.

In the target state, digital competence develops as a uniform learning path where a strong foundation for lifelong learning is created in early childhood education and care, pre-primary, primary and lower secondary education, while taking into account the European framework of reference. Local digitalisation plans and strategies have been updated based on the national framework for digital competence and their use has become established. The learner's digital competence path is a continuum across educational shifts and transitions up to the next level. The prerequisites for mapping and monitoring competence are in order thanks to training, tools and common practices. Competence is built on strong general knowledge and the application of competence. Children and young people use the opportunities offered by digitalisation by adopting ways to use and apply digital devices and services that are appropriate and specific to each field of science. In this way, the use of technology increasingly supports the objectives of the national core curriculum and, consequently, the learning of the child or young person. Particular attention is paid to children and young people's media literacy and staff's media education skills. AI literacy and critical literacy are also strengthened. Staff and administration in the sector have the necessary digital skills, and the national skills gap has narrowed. The continuing education system functions more efficiently and flexibly and takes into account changing skills needs. The equality of digital competence has been ensured with sufficient normative guidance.

Key tasks:

- Support the competence development of children, young people and staff
- Maintain and develop the descriptions of the digital competence of children and young people and monitor competence development
- Produce, maintain and develop descriptions of the staff's digital competence and monitor competence development
- Promote the use of digital devices and services in learning and teaching
- Systematically target and utilise continuing education and the one-stop principle of education and training provision
- Develop the content of the certificate in educational administration with consideration to the management of digitalisation
- Strengthen digital competence through normative guidance

## 2.3 Support for the development of digital infrastructure, services and interoperability

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of the support for the development of digital infrastructure, services and interoperability:

- Ensure the security, quality and interoperability of digital services and content.
- Support pedagogical work with national and local digital infrastructure.
- Strengthen the national mix of digital services and infrastructure.
- Create support material and control structures to develop and maintain interoperability.

Functional and safe digital infrastructure and services create a foundation for the development of competence in education and teaching, but in the current state they do not enable equally supportive and pedagogically meaningful learning environments for children and young people. Decisions on procurements of telecommunications networks, hardware, software and other digital infrastructure are mainly made by providers of early childhood education and care, pre-primary, primary and lower secondary education. The national education and teaching services of the Finnish National Agency for Education, such as StudyInfo and the MPASSid identification brokering service, support the local tasks of the education providers and harmonise the development of digital services for education and teaching. Interoperability has also been promoted by investing in terminology and architecture work but, despite the efforts made, it is still not at a sufficient level. In addition, liability issues related to service procurement and maintenance have increased and are causing new problems at local and national level. It is recognised that the development of solutions requires a national approach and common rules, and it concerns, in particular, digital infrastructure, interoperability of services, information security and ensuring the continuity of operations.

In the target state, the implementation of digital services for education and teaching is based on scientific data, a culture of experimentation and the sharing of good practices, which are promoted at all levels, learning from own experiments and those of others. Scalable solutions help to identify the support needs of children and young people, to prevent related issues, to stage interventions and to assess impact. There are ongoing education and teaching development projects that develop operating models for the pedagogical utilisation of digital technology. In addition, nationally consistent criteria for digital environments have been

described, along with recommendations for infrastructure. The maintenance of a strategic overview and the effective communication of development needs have been made possible by networks.

Key tasks:

- Draw up interoperability rules and principles for digital services and solutions
- Promote wider use and consolidation of the national identification brokerage service in education, learning and teaching services
- Develop a learning outcomes assessment system and utilise assessment data
- Facilitate networks to maintain a strategic overview of services and development needs

## 2.4 Data management and quality

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of data management and quality:

- Ensure the availability of high-quality and up-to-date data for the needs of knowledge-based management.
- Conduct development based on knowledge.
- Enable knowledge-based management, guidance and foresight.

The knowledge base in the sector is fragmented and varies in both quality and scope. Providers of early childhood education and care, pre-primary, primary and lower secondary education are in very different positions in terms of data production and its development, and national data production does not serve them to the desired extent. From the management point of view, the situation is unsustainable; constantly reactive instead of being proactive. In the current situation, administrative work involves many overlaps and other additional workload that needs to be streamlined together. The division of responsibilities between different government bodies is partly unclear, and the discussion should also include various research institutes, material producers and utilisers. There are also concerns about the cost impacts of data production.

In the target state, the production, utilisation and presentation of data have taken a leap forward. The collected data are widely known and utilised in a variety of ways, including better utilisation in strategic guidance, management and research.

Common master data are described and data models are used. The quality of the register data included in the knowledge base is in order and the availability of information on operations, quality and financing is secured. Utilising and combining data from existing databases responds more extensively to information needs and thus reduces the need for separate data collections. If necessary, the data in the databases is supplemented with lighter sum-level data collections. The available statistics are comprehensive and the communication activities that explain them are impressive. The data management support services are at the desired level and the operators' data management capabilities are promoted by providing and developing instructions and good practices.

Key tasks:

- Identify and describe master data
- Implement the data quality framework
- Develop coordination of national data collections between authorities
- Report on streamlining the utilisation of data
- Report on the publicity of education and training data and the development needs of data reporting and data management

## 2.5 Data protection and information security

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of data protection and information security:

- Ensure the ability to maintain a secure digital operating environment on a pedagogical basis.
- Ensure the security of the digital learning environment in procurements.
- Take care of the data protection of the individual in the operating environment at all stages.

Data protection and information security are currently facing a number of challenges in the sector, and the constant changing in the operating environment sets its own requirements for operators. There are ambiguities in the educational use of online learning platforms, cloud services and personal services, as well as in matters related to the implementation of information exchange between organisations and the introduction of new services. In the current state, municipalities have disparate recommendations related to data security and protection. On the other hand, data security audits, for example, are repeated several times on the same software by different actors. In various procurements

related to digitalisation in education and teaching, the management of all areas related to data protection and information security has been perceived as difficult. In addition, the rapid pace of technological development, the arrival on the market of emerging technologies, such as AI, and the related increasing national and EU-level regulation all require constant updating of data protection and information security practices. This calls for much streamlining and harmonising. There is a clear need in the sector for common national data protection and information security operating models for education and teaching, with pragmatism at their core.

In the target state, various education and training operators use common data protection and information security operating models. In addition, competence has developed to the required level and support structures are clear. There is a common understanding of responsibility issues in relation to different levels and operators. Work around the topic has been rearranged so as to significantly reduce repetitive and overlapping tasks, and cooperation is extensive and well organised. When making procurements, it is possible to rely on common guidelines and recommendations, and providers of early childhood education and care, pre-primary, primary and lower secondary education are not left alone with issues related to data security and protection in procurements. Comprehensively, the field of data protection and information security has been formed in the sector in such a way that, centrally, the expertise on the topic is broader and deeper, and even wider groups of operators can rely on common operating models and rules.

Key tasks:

- Develop a national operating model
- Develop cooperation
- Resolve challenges related to Data Protection Impact Assessment (DPIA) assessments and service contracts
- Prepare guidelines related to cloud services
- Share good practices and effective solutions

## 2.6 Digitalisation-related legislation and legal interpretation

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of digitalisation-related legislation and legal interpretation:

- Strengthen the strategic definition of the target level of digital competence.
- Expand the strategic guidance related to digital operating environments.
- Establish national principles for the interoperability of digital services and solutions.
- Enable comprehensive control of the registry database, data interoperability, availability and quality.

In the fast-paced development of digitalisation, the responsibilities of providers of early childhood education and care, pre-primary, primary and lower secondary education have been increased through legislation. For example, compliance with the requirements of the General Data Protection Regulation has proven to be very challenging for many education providers. Training and education to improve knowledge of legislation and also support for legal interpretation is needed. The diversity of legislation may also have created inappropriate barriers to the development of digitalisation in education and training in the form of various obligations. The effects also extend to procurement issues and the planning and provision of education. The development of data management and interoperability requires legislative reforms. In addition, digital competence plays much too small a role in the current normative guidance, which does not correspond to the needs of the present state of society.

In the target state, knowledge of the legislation is more comprehensive than at present, thanks to consistent education and training. The certificate in educational administration includes knowledge of legislation related to digitalisation. In addition, providers of early childhood education and care, pre-primary, primary and lower secondary education have at their disposal the necessary guides to facilitate legal interpretation. The impact of legislation on the development of digitalisation has also been investigated and a common view of the sector on the objectives of future development work has been formed. In the education sector, the grounds for processing personal data have been strengthened and clarified. The steering of data production and interoperability is stable. The importance of digital competence in education and teaching can also be seen through normative guidance.

Key tasks:

- Taking digitalisation into account as a part of the development of the Basic Education Act
- Strengthen the assessment of the impact of data management in legislative projects
- Improve knowledge of legislation
- Develop content of the certificate in educational administration with regard to legal knowledge of digitalisation
- Clarify the need for legislative changes related to the data production
- Prepare guides for legal interpretation

## 2.7 Digitalisation research

Key messages of the 'Policies for the digitalisation of education and training until 2027' from the perspective of digitalisation research:

- Develop and evaluate everyone's competence based on research data.
- Promote the impact of education and teaching, and the monitoring of development through research.
- Take into account the important role of research in achieving the target state in terms of competence, services and information.
- Direct research funding towards the production of data that supports the development of services and ensuring that research-based information is available on the use of digital technology.
- Enable research with a high-quality and interoperable data infrastructure.

Extensive research into the effects of digitalisation is essential. The existing research base is still scarce in places. More research on digitalisation in education and teaching is needed in order to understand the wide-ranging effects of the diverse phenomenon and thus manage and control it more effectively.

In the target state, digitalisation is promoted based on scientific data. A wide range of research data is available on the impact of digitalisation on learning environments in early childhood education and care, pre-primary, primary and lower secondary education, as well as on the growth, learning, teaching and learning outcomes of children and young people, and it guides the development of digitalisation. In addition, there are scientific data on the phenomena related to

the wellbeing of children and young people in the field of digitalisation, and the information obtained has helped to identify the necessary measures to increase wellbeing.

The role of digitalisation in the wellbeing and ability to cope at work of education and teaching staff is investigated. The effects of the use of digital learning environments on learning, the utilisation of acquired learning and learning-to-learn skills are studied extensively. In addition, funding is directed to the production of data that supports the development of early childhood education and education in general.

The national impact of research is promoted by means of a common data infrastructure for the education, teaching and training sector, which includes the sector's data resources, statistical data, archive data and up-to-date reports and research results. Digital solutions for the utilisation of research and information have evolved on the basis of the information infrastructure.

Key tasks:

- Explore the existing knowledge base and support the dissemination and utilisation of information in the development of digitalisation and teaching in education
- Examine the prerequisites for the advancement of digitalisation in education and teaching
- To investigate the effects of digitalisation, target research at:
  - the work, competence development and wellbeing of education and teaching staff
  - the pedagogy and learning environments of early childhood education and care, as well as the growth, learning and wellbeing of children
  - learning processes, teaching and learning outcomes
  - the wellbeing of children and young people
- Develop additional knowledge and understanding of the use of emerging technologies (such as AI) to advance educational objectives
- Examine the conditions for the implementation of a certification procedure for digital research-based learning environments and applications
- Promote the use of the education and training knowledge base and information infrastructure in research

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