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Policies for the Digital Transformation of School Education: Proposed analytical framework and methodology

16-17 March 2023, OECD Conference Centre, Paris, France.

This document contains the proposed analytical framework and methodology for the project Policies for the Digital Transformation of School Education (Strand 1 of the OECD umbrella project on Resourcing School Education for the Digital Age: Effective Digitalisation and Future-Ready Teachers) to be discussed at the 8th Meeting of the Group of National Experts on School Resources (GNE-SR) on 16-17 March 2023.

The Group of National Experts on School Resources (GNE-SR) is invited to:

- COMMENT on the proposed analytical framework, scope and methodology of the project;
- PROVIDE GUIDANCE on the most relevant policy issues and questions among the proposed focus areas to be addressed by the project.

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Policies for the Digital Transformation of School Education: Proposed analytical framework and methodology

Background and related documents

Resourcing School Education for the Digital Age: Effective Digitalisation and Future-Ready Teachers is an umbrella project included in the 2023-24 Programme of Work and Budget (PWB) [EDU/EDPC/CERI(2021)3]. Under the guidance of the Group of National Experts on School Resources (GNE-SR), the umbrella project seeks to investigate how countries can design system-level policies that enable their school sectors to achieve excellence and equity in the digital age. It is comprised of three strands, which seek to address the following questions:

- Strand 1 (*Policies for the Digital Transformation of School Education*): How can education systems create a **comprehensive and integrated system-level policy environment** that enables an **effective and equitable use of digital resources**?
- Strand 2 (*Policies for a Future-Ready Teaching Profession in the Digital Age*): How can education systems **re-design teacher policies** to leverage the momentum gained during the pandemic and advance the **profession's transformation for the future**?
- Strand 3 (*Policies for Efficient Investments in School Education*): How can education systems more efficiently **mobilise and use education resources to foster inclusive growth and enhance societal outcomes**?

Strands 1 and 2 consist of two inter-related, complementary projects, while Strand 3 consists of ad-hoc knowledge mobilisation activities funded by Voluntary Contributions.

The *Policies for the Digital Transformation of School Education* project (Strand 1) supports countries in designing a comprehensive and coherent policy ecosystem that consolidates a range of education policy measures and addresses the regulation and use of digital resources in a holistic way. This document sets out a proposed analytical framework, a methodology and key issues for the project's analysis. It also seeks to explain how the project can complement the OECD's wider work on the digital transformation in education and capitalise on OECD's greatest strengths by providing a setting where governments can compare digital education policy experiences, seek answers to common challenges, and identify and share good practices.

This document should be read in conjunction with the Annex document *Policies for the Digital Transformation of School Education: State of play and key policy responses*

[EDU/EDPC/SR(2023)2/ANN1]. The latter i) provides the state of play and key challenges faced by countries and ii) discusses key policy responses and promising approaches with respect to each of the analytical dimensions identified in this document.

Introduction

1. Digital technologies are a key resource for OECD education and training systems. They provide access to countless learning resources, can transform teaching and learning practices in schools and beyond, and improve decision-making in education and training systems thanks to novel data collection and analysis. Investment in education technology worldwide has surged in the past decade, going from USD 0.7 Billion in 2011 to USD 20.8 Billion in 2022 (IDB and HolonIQ, 2021[1]). Digital technologies increasingly permeate schools and classrooms, and during the COVID-19 school closures they enabled the continuation of organised instruction. However, education systems are far from providing full and equitable access to high quality digital technologies, and current forms of use do not yet realise the full potential of digital technologies for teaching and learning.

2. Digital education technologies have the potential to enhance student outcomes by enabling education systems – at all levels – to better meet their students' needs, enhance educators' ability to provide high-quality instruction, and improve the effectiveness of learning. The use of digital technologies can allow for a more engaging and differentiated instruction that is responsive to students' learning needs and interests (Ganimian, Vegas and Hess, 2020[2]; Røe, Wojniusz and Bjerke, 2022[3]); it may enhance the effectiveness of educators and the number of students they can reach; and it may help to overcome learning inequalities and create more inclusive education systems (ICF Consulting Services Ltd, 2015[4]). Besides improving learning outcomes, the use of digital education technologies has been credited for its potential to enable a more engaging and enjoyable learning experience, to promote the development of non-cognitive skills, and to broaden students' horizons by letting them engage with people and ideas from across the world (OECD, 2020[5]). Others have underscored the challenges inherent in the use of digital technologies in education and the need to create a supportive environment and enabling conditions to make the most of them (OECD, 2019[6]; OECD, 2021[7]; Bulman and Fairlie, 2016[8]).

3. The COVID-19 pandemic has led to an unprecedented increase in the use of digital education technologies and added salience to the question of how education systems can harness the full potential of digital education (Box 2), while mitigating associated risks. Prior research and analyses on the use of digital technologies in education have put much emphasis on the availability, use and effectiveness of digital resources at the classroom and school levels. In contrast, the necessary policy framework to foster innovation and the role of the system-level policy environment in supporting an effective and equitable use of digital resources in schools has received more limited attention. A strategic vision for digital education underpinned by concrete funding, governance and implementation arrangements has not been fully in place in all OECD countries (see Annex document for evidence on digital education strategies in OECD countries since the pandemic [EDU/EDPC/SR(2023)2/ANN1] and (van der Vlies, 2020[9]) for a review of digital education strategies in OECD countries before the pandemic).

4. The wide-ranging, inter-related implications of digitalisation for student learning, teachers' time and professional growth, schools' infrastructure and the management of education systems raise challenges that require a holistic policy approach. The project on *Policies for the Digital Transformation of School Education* will investigate, under the guidance of the GNE on School Resources, how countries can design system-level policies that enable their school sectors to achieve excellence and equity in the digital age. It proposes to examine the policy ecosystem that can support a more effective and inclusive use of digital resources in education.

5. This document thus focuses on how countries can build a comprehensive, coherent, and coordinated policy infrastructure and enable good practices to support digital education. It puts forward a draft analytical framework (Figure 1 and Figure 2) for a digital education policy ecosystem, highlighting the range of policies that need to be coordinated into a coherent policy ecosystem for successful digital education. The proposed draft analytical framework provides a systematic approach to analyse digital education policies that relate to the digital transformation in primary and secondary schooling, and reflects existing differences in school systems governance and in the levels of digital maturity between, and within, different sectors of the education system. It also recognises that all policy levers (as well as their timing and sequencing) do not apply equally to countries according to their level of digital development.

6. This document is organised as follows:

- First, the document situates the analytical framework in the wider context of EDU work on the digital transformation of education.
- Second, it presents the draft analytical framework for a digital education policy ecosystem:
  - A first sub-section on the "Scope of the analytical framework" provides a general overview of the proposed framework as well as key considerations regarding the different levels of digital exposure and development of education systems. The stage of digital maturity of education systems, in turn, has implications for the sequencing and timing of digital education policies examined by the framework. The section also puts forward considerations about the potential of digital technologies themselves for enhancing policy making and addressing some of the underlying policy challenges triggered by the digital transformation of education systems.
  - The second sub-section on "Levels of analysis" examines the levels at which the different policy levers put forward by the proposed framework are considered.
  - The third sub-section on "Analytical dimensions" provides a detailed description of each of the major analytical dimensions examined in the proposed framework.
  - The final sub-section on "Digital education outcomes" examines the expected outcomes stemming from the design of a comprehensive and coordinated policy ecosystem for digital education as underpinned by the framework.
- Third, the document presents a proposed methodology for the project on *Policies for the Digital Transformation of School Education*. It describes the different ways in which countries can participate in the project and provides a detailed description of its main components, methods, governance, timeline and cost.

7. The Group of National Experts on School Resources (GNE-SR) is invited to:

- COMMENT on the proposed analytical framework, scope and methodology of the project;
- PROVIDE GUIDANCE on the most relevant policy issues and questions among the proposed focus areas to be addressed by the project.

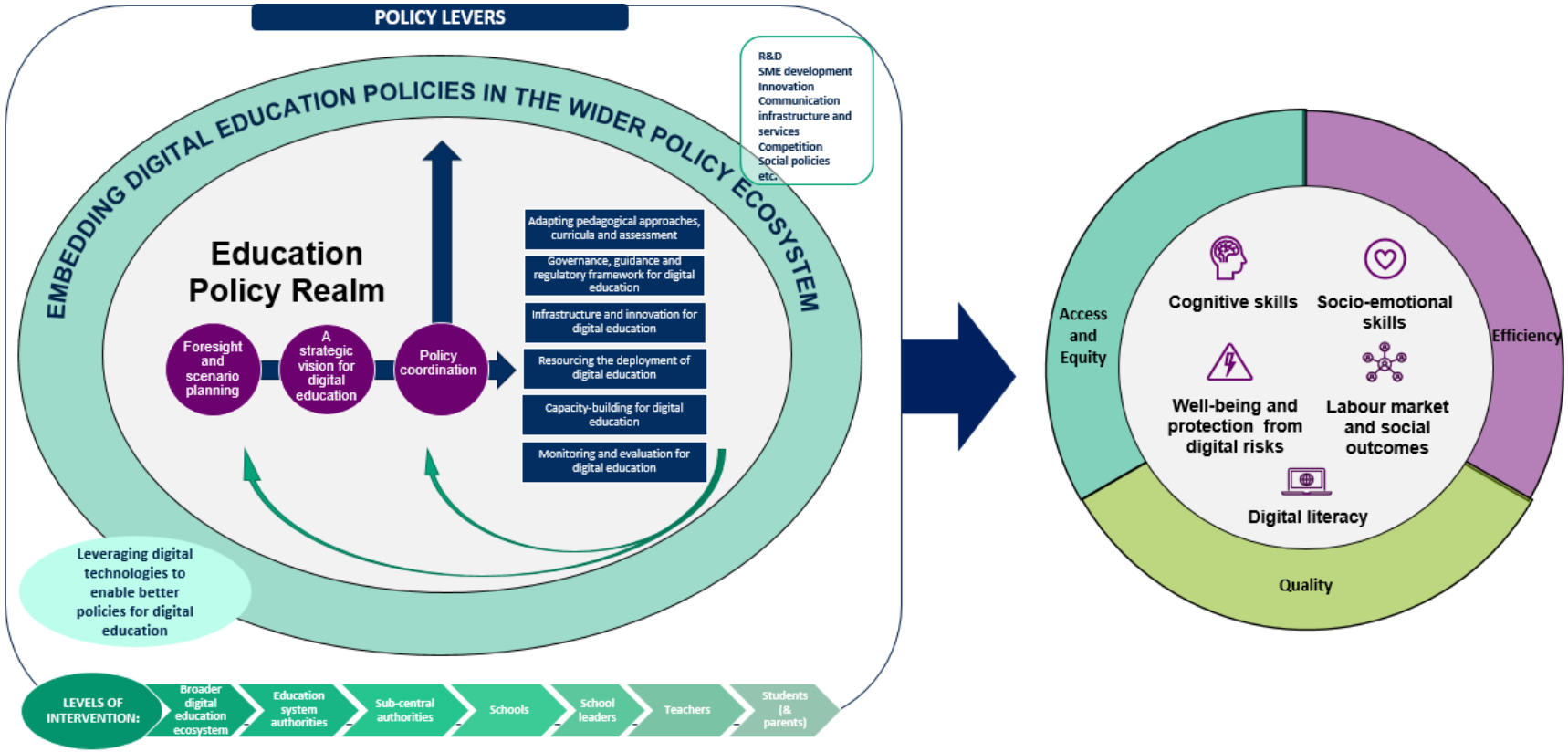
Box 1. Digital education definitions and scope

The term "digital education" encompasses all forms of teaching and learning enhanced by the use of digital technologies – whether fully online (both synchronous and asynchronous), hybrid, or blended teaching and learning activities:

- *Online education*. In this type of education, all instruction is delivered online, either synchronously or asynchronously, or a combination of both. While instruction is delivered at a distance, learners may have an opportunity to meet in person with peers or instructors, or to make use of on-campus facilities and learning materials. It is different from "distance education", which is the term used to describe all technologies in which learner and instructor are physically separated. This includes the Internet, but also radio, television, and print-based instruction. Online study programmes may make wide use of digital technologies – such as learning analytics and personalised instruction – or they make little use of digital technologies beyond web-based delivery of instruction.
- *Hybrid education*. This type of education relies on mix of online and face-to-face instruction, with the online components taking place synchronously, asynchronously, or as a combination of both. In contrast to blended education, hybrid education uses online instruction to replace and thus reduce the frequency of in-person instruction.
- *Blended education*. In this type of education, instruction takes place fully in-person and is blended with and complemented by online materials and activities. In blended courses, instruction may make use of a virtual learning environment (VLE) / learning management system (LMS), open educational resources (OER) available online through a VLE/LMS, personalised, adaptive learning, simulations, or gaming. Therefore, digital components are not meant to 'replace' face-to-face class time; rather, they supplement and build upon the content discussed in the classroom.

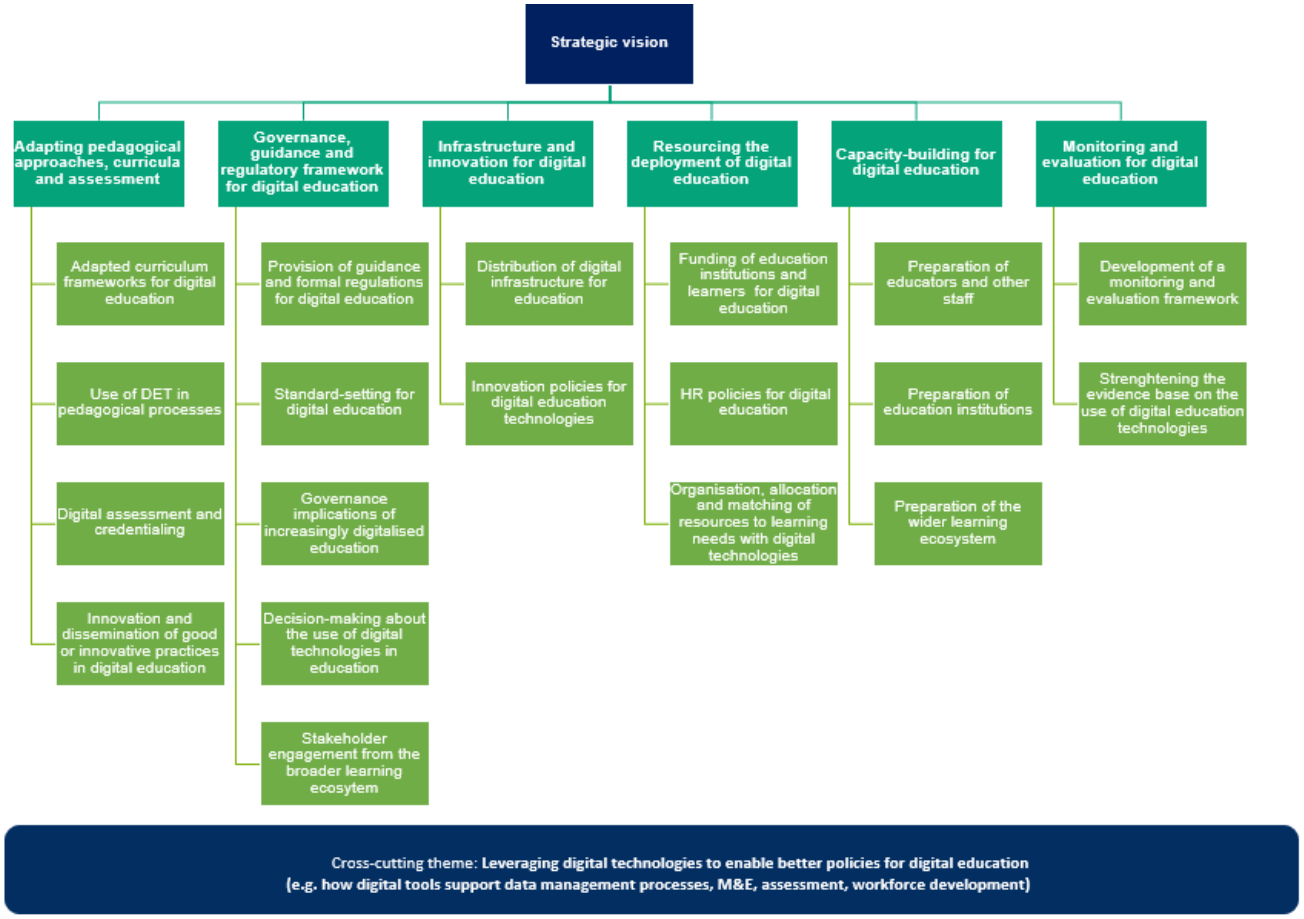
A range of digital technologies can be used for digital education, including a great variety of tools, software, and learning resources. For the purpose of this document, digital technologies are understood in a broad way, as including networks (e.g. Internet connection), software, hardware and network-supported services that are used by educators and students in the process of teaching and learning. The scope does not cover the other functions for which digital technologies are used by educational institutions, including institutional planning, business processes, the management of physical and human resources, and research infrastructures.

Figure 1. An analytical framework for a digital education policy ecosystem: an overview



Source: Authors' elaborations.

Figure 2. An analytical framework for a digital education policy ecosystem: digital education policy levers



Note: "DET" stands for digital education technologies.
Source: Authors' elaborations.

Related OECD work on the digital transformation of education

8. The proposed analytical framework for the OECD project on *Policies for the Digital Transformation of School Education* builds on a range of sources, research, and policy evidence on digital education policies, as well as more general resourcing policies for school education. In particular, the framework relies on international evidence and best practices in the area of policies for digital education stemming from OECD and non-OECD work on the digital transformation of education systems, existing digital competence frameworks (Vuorikari et al., 2022[10]; European Commission, n.d.[11]; Redecker, Punie and European Commission. Joint Research Centre., 2017[12]), as well as analytical frameworks and policy projects focused on relevant areas for digital education (e.g. the OECD School Resources Review analytical framework, the OECD Strength through Diversity analytical framework for inclusive education).

9. Previous OECD research and data collection have mostly revolved around the role of digital tools for student learning at the classroom level, as part of teaching and learning activities, as well as the technologies available for this purpose (Minea-Pic, 2020[13]; Vincent-Lancrin, 2022[14]). The access to and use of digital technologies in school education (as tools for teaching and learning, but also as objectives of learning) have been at the core of most analyses. A different, relatively smaller strand of work has revolved around policies to support and seize the benefits of digital transformation in education systems. However, many gaps remain with respect to the policy framework surrounding the use of digital resources in education at the system, sub-system, and school levels.

10. The OECD Directorate of Education and Skills (EDU) currently covers the digital transformation in education under three pillars: i) frontiers – exploring the frontiers of digitalisation; ii) practice – documenting and understanding practice and how it could be improved; and iii) policy – analysing countries' policy approaches to digitalisation (Vincent-Lancrin, 2022[14]). The *Policies for the Digital Transformation of School Education* project falls under the policy pillar as it investigates the system-level policy environment that enables an effective and equitable use of digital resources. The project and this analytical framework build synergies with both the frontiers and practice strands of ongoing work in EDU, as well as with the other existing policy-related projects:

- **Frontiers**: the framework builds on the CERI's Smart Data and digital technology in education analytical work on countries' digital learning ecosystem, regulation and practice, as well as on the standards/guidelines-related work focused on digital resources and interoperability.
- **Practice**: the project has drawn and will continue to utilise data from the OECD PISA and TALIS as they collect evidence on learning and teaching using digital tools and resources. This is even more relevant given that the upcoming rounds of both surveys will cover digital education-related topics in greater depth. The analytical framework has also built on the existing themes and topics covered by PISA and TALIS questionnaires, and by the PISA 2022 ICT framework.
- **Policy**: The analytical framework also draws on evidence from CERI's 21st Century Children project on the role of education systems in combatting digital risks for children, the "ECEC in a Digital World" project analytical framework, and the Education 2030 work on the integration of digital competence in education curricula. The project will also create synergies with the "Enhancing higher education performance" project that will be conducted in the 2023-2024 biennium.

11. The project will thus build upon – and inform – future-oriented and technology-focused analysis, as well as practice and policy-related work undertaken in other EDU projects. It will also work on policy alignment through collaboration with the Directorate for Science, Technology and Innovation, and in particular with the Going Digital horizontal initiative and the Observatory of AI, as well as with the Centre for Skills and in particular with the "VET Going Digital" project.

Analytical framework

Scope of the analytical framework

12. The project aims to support education systems in creating a comprehensive and integrated system-level policy environment that enables an effective and equitable use of digital technologies in education. Digital technologies are defined broadly and comprise several distinct categories, including networks (e.g. Internet), hardware, software and technology-related services (Box 2). The analysis examines the use of digital technologies from primary to upper-secondary education (ISCED 1-3)[1], although countries engaging in a country diagnosis or review may choose to focus on one or more of these levels, based on their interests and needs. Likewise, while the proposed analytical framework is designed to generally apply to all policy areas relevant for digital education, individual country diagnoses or reviews could be tailored to place greater emphasis on the challenges and practices of one or several policy areas and their coordination with the entire policy ecosystem (see section on the project's methodology below). The same would apply for education sectors, where country diagnoses or reviews could be tailored to the specificities of a particular sector (e.g. SEN education, public and/or publicly funded private schools).

Box 2. Digital technologies

Digital technologies as defined in this document include:

- networking including on-site networking (wired and wireless, staff, students, and public) and long-haul and off-site networking, including telecommunication services;
- on-premises server hardware and audio-visual equipment;
- end-user devices, including general-purpose hardware devices for staff and students, such as PCs, Macs, tablets and smartphones;
- application software including corporate and end-user systems, including educational software;
- data centres, support for services including Application Programming Interface (API) integration ('middle-ware');
- Cloud services;
- capability services such as technical support.

Throughout the document, digital technologies and digital infrastructure are used interchangeably.

Many other aspects of education may be digitally mediated, including student recruitment, academic advising, career advising and learning support. Digital solutions may be also used by education managers to increase the efficiency of their operations, including Customer Relationship Management (CRM) or Student Information Systems (SIS). The analysis in this document takes a close look at applications used in teaching and learning, and does not focus on student support and institutional management systems.

13. Keeping in mind the definitions and clarifications of scope above, the proposed analytical framework takes a holistic approach to digital education policies. As such, it has the key aims to:

- promote a comprehensive understanding of the range of policies within the education realm that are necessary for digital education and their interaction with the broader policy ecosystem (analytical dimensions);

[1] The use of digital technologies in VET systems will be covered by another OECD project unfolded by the OECD Centre for Skills. The use of digital technologies in ECEC has been covered by the ECEC in a Digital World project.

- facilitate analysis of the implications of digital education policies for a range of actors within and outside of the education policy realm (analytical levels);
- highlight the effect of digital education policies on a broad spectrum of education outcomes (education outcomes).

14. Indeed, successful digital education requires leveraging a wealth of policy levers operating at different levels of intervention and impacting different players of the education system (e.g. students, teachers, school leaders, sub-central authorities). While some of these policy levers belong to the realm of education policy, others depend on other policy areas and require coordination with authorities in charge of other sectors. Similarly, policies for digital education must be considered within the context of the specific education governance environments within which they function and dynamically respond to the new opportunities and needs that arise from emerging technologies. The success of digital education policies must ultimately be assessed against their contribution to a broad range of education outcomes, requiring an understanding of the multifarious ways in which policies for digital education interact with other policies to improve student skills, well-being, and broader social and labour market outcomes.

15. To navigate these complexities, a well-functioning digital education policy ecosystem (Figure 1 and Figure 2), must be centered around a **strategic vision** and:

- **include mechanisms for coordination** across policies to ensure the vision can be achieved:
  - within the education realm – e.g. to other education priorities or strategies;
  - outside of the education realm – e.g. with other policy sectors;
  - and across the different policy dimensions (Figure 2) and across layers of the system (the different levels of intervention);
- **account for the governance arrangements of education systems**, while aiming for policy coherence;
- **include feedback loop mechanisms** to adjust the strategy/coordination to evolving trends and feedback from the ground.

16. Within the education realm, a range of policy levers can support more effective digital education. These include policies relate to:

- **Adapting pedagogical approaches, curricula and assessments**, focusing on policy levers that can help to promote more effective uses of digital technologies for teaching and learning. This dimension considers policies to support the development and selection of suitable digital education technologies as well as the dissemination of effective pedagogical practices involving digital tools. It also examines the adaptation of curricula and assessment frameworks and strategies to overcome barriers that have so far limited the take-up and effective use of digital technologies for teaching and learning.
- **Governance, guidance and regulatory framework for digital education** by providing guidance (e.g. through standards – including minimum standards where relevant, guidelines, and recommendations) and formal regulations (with an associated legal obligation) for an efficient and safe use of digital education technologies; organising decision-making arrangements related to digital education (e.g. institutional arrangements, distribution of roles and responsibilities for digital education); designing participatory mechanisms for stakeholder engagement at different levels of the education system, and addressing the governance implications of increasingly digitalised education institutions and hybrid learning.
- **Infrastructure and innovation for digital education,** through policies to ensure equitable access to and adequacy of digital education technologies for students and education institutions. This includes distribution mechanisms for digital education technologies that allow achieving desired policy targets such as strategies to bridge digital divides between education institutions. It also

requires multi-dimensional and co-ordinated policy efforts to support innovation for digital education technologies (e.g. tax incentives, grants for business R&D and innovation, reducing regulatory burdens for start-ups).

- **Resourcing the deployment of digital education**, by designing funding frameworks to back up digital education policy objectives with the necessary financial resources and supporting better institutional procurement strategies and budget practices. This also involves adapting human resources frameworks (incl. career structures, progression criteria and working time arrangements) for an effective use of digital technologies by teachers and in schools; and organising, allocating and matching resources to learning needs with digital technologies (e.g. the organisation of teaching and learning time for more effective use of digital resources, the organisation of physical infrastructure for learning with digital technologies);
- **Capacity-building for digital education** among educators, education institutions and actors across the wider learning ecosystem (incl. e.g. specialist staff, parents and local administrators). The dimension considers a range of policy levers ranging from the initial education and continuing professional learning of educators (including the support of peer learning and communities of practice). It also considers how governments can provide education institutions with guidance on the integration of DET, support their leadership and strengthen their ability to engage in institutional improvement strategies in the area of digitalisation.
- **Monitoring and evaluation for digital education**, by developing a holistic monitoring and evaluation framework in line with national objectives for digital education; utilising existing indicators and data sources on the state of digitalisation in the education system; strengthening the evidence base on the use and impact of digital education technologies and supporting the monitoring and reporting on digital technologies' use in education.

17. This proposed analytical framework puts forward a comprehensive and co-ordinated approach to building a digital education policy ecosystem. While all education systems have increasingly been exposed to digitalisation, particularly in the context of the COVID-19 pandemic, they stand at different levels of digital exposure and development. EU countries display, for instance, wide variation in students' and education institutions' access to quality Internet connection and digital equipment. In turn, this translates into variations in how education institutions, teachers and students can utilise digital technologies in the learning process. While advanced technologies such as Artificial Intelligence (AI) or Blockchain are generally not mainstreamed, some education systems are already considering or have started introducing tools based on such technologies whereas others continue experiencing challenges in providing access to standard digital devices for learning.

18. In this respect, while the proposed analytical framework proposes a comprehensive list of policy levers for digital education, it is important to recognise that all policy levers do not apply equally to countries according to their level of digital development/maturity. The state of digital development of each education system also determines the sequencing and timing of such policies. Countries with high shares of students lacking basic access to quality Internet connection or digital equipment for learning should begin by supporting investment in the provision of access to digital education technologies. In contrast, countries that are further ahead in the digitalisation of their education systems can put a stronger emphasis on steering innovation in digital education technologies, enhancing the monitoring and evaluation of digital education to ensure the sustainability of its outcomes, but also on investing in forecasting and scenario-planning to ensure that their policies adjust to evolving digital technology trends. Irrespective of education systems' starting point and their current state of digital exposure, this analytical framework provides a general checklist of policies to consider for enabling a more effective roll out of digital education. An assessment of where countries stand in the digital transformation of their education systems and the challenges they face as digital technologies increasingly permeate learning processes can provide a first step in guiding the sequencing of policies necessary to enable successful digital education.

19. In addition, digital technologies themselves can support better policies for digital education. As data creation and collection expands with digital transformation, OECD countries are increasingly putting data at the core of their digital strategies. In education systems, data – and big data – can support teachers, school leaders and policy makers in improving the effectiveness of their practices and policies. Digital technologies and data can be used to improve policy coordination and create more integrated public services or more easily identify emerging trends (e.g. in terms of new professional development needs). Advanced technologies, such as AI, promise significant change to various areas of education systems, including assessment, learning analytics for parents, schools or school systems, dropout reduction or credentials (OECD, 2021[15]).

Levels of analysis

20. The analytical framework takes a broad perspective of the different levels of analysis for digital education policies. The analysis of current and promising policies thus considers the implications of digital education policies for a range of actors including:

1. Students: as the primary beneficiaries of digital education
2. Parents: to the extent that parents can facilitate and shape student engagement with digital education technologies or raise students' awareness about digital education-related risks and protect them, particularly when digital education activities take place in hybrid or fully online formats
3. Teachers: as key actors engaged in the delivery of digital education
4. Schools, including the school's leadership team: as key facilitators of institutional change
5. Sub-central authorities: including local authorities that may be involved in the acquisition of digital technologies for education institutions or the provision of support to the latter
6. Education system authorities: as entities responsible for providing an overall direction, central guidance and regulation, designing curricula and funding arrangements for digital education
7. Broader digital education ecosystem: including a range of other actors who also shape digital education, such as education technology (EdTech) developers, higher education and research institutions, teacher unions, etc.

21. To the extent that digital education does not happen in isolation, digital education policies need to be coordinated with the wider policy ecosystem. Therefore, the analytical framework accounts for the links that digital education policies need to establish with other areas of government policy (e.g. innovation, labour market, social policies) and the necessary interactions between education ministries and the actors involved in the design and implementation of those policies.

Analytical dimensions

22. To realise the potential of digital technologies for learning and teaching, this analytical framework puts forward 7 analytical dimensions:

1. A strategic vision for digital education (including foresight, policy coordination and feedback loop mechanisms)
2. Adapting pedagogical approaches, curricula and assessments
3. Governance, guidance and regulatory framework for digital education
4. Infrastructure and innovation for digital education
5. Resourcing the deployment of digital education technologies
6. Capacity-building for digital education
7. Monitoring and evaluation for digital education

23. The following sub-sections will provide a more detailed description of the policy levers related to each of these analytical dimensions.

A strategic vision for digital education

24. This dimension overarches the more specific policy levers addressed in the following dimensions by underlining the importance of a strategic vision that encompasses all aspects of digital education. As such, a strategic vision must clearly set out goals for digital education and link them to concrete policy measures regarding i) pedagogies, curricula, and assessment, ii) guidance and regulation for digital education, iii) the creation of the necessary preconditions for digital education, iv) the provision of the necessary physical and human resources for digital education and v) building capacity for digital education whilst providing concrete provisions for vi) the monitoring and evaluation of digital education.

25. However, having a strategic vision for digital education alone is not enough to guarantee that good intentions turn into policy practice. Rather, strategic documents coupled to time-bound action plans and specific funding arrangements are most successful in stimulating and co-ordinating policy reform.

26. The design of a strategic vision for digital education also requires awareness that the proposed policies seldomly work in silos. A range of policies both within and outside the realm of education have tangible effects for the implementation of digital education strategies. This includes, for instance, policies for regional development, regulations of the tech sector or teacher professional development policies. Thus, a strategic vision for digital education must be aligned with the broader policy ecosystem to ensure that initiatives in one area do not undermine efforts in another area.

27. Trends towards decentralisation and school autonomy have created the need for strategic documents to be adapted to the governance arrangements within which they function. In this context, a strategic vision for digital education as well as related implementation plans should serve to delineate responsibilities between different levels of government, schools and other relevant agencies and encourage the co-operation between them.

28. While a strategic vision for digital education should provide medium- to long-term guidance on the direction of policy reform, it also needs to be flexible enough to enable the incremental evolution of the policy ecosystem in response to societal, technological or economic changes, and the integration of new policies as they are developed. Indeed, digital education strategies or overarching policies may need adaptation as new digital technologies become available or based on emerging feedback or needs from the field. Such flexibility and responsiveness is critical in a rapidly-evolving field such as digital education, and can be embedded in its design through purposeful feedback loops to identify emerging needs, constraints or challenges, implementation issues or undesired effects and to adjust the strategic directions as the digital education ecosystem evolves and matures.

29. In summary, the relevant questions for this dimension include:

- How might strategies for digital education support the implementation of digital education policies and enhance their coherence?
- Which other policies outside and within the education realm might affect strategies for digital education and how can synergies be maximised?
- What role can strategies for digital education play in co-ordinating the responsibilities of different actors and levels of policy implementation?
- How can we ensure the status of strategies for digital education as living documents that are equipped to adapt to fast-changing changing technological environments and are responsive to experience and feedback?

Adapting pedagogical approaches, curricula and assessments

30. The COVID-19 pandemic has accelerated the use of digital technologies in education systems. Despite the speed and difficulty of the transition, many educators and learners across OECD countries managed to adapt to the new situation, temporarily moving to online delivery and ICT-enabled remote education. This increased take-up of digital learning tools could provide the basis for a significant expansion of digital education in the future (OECD, 2021[16]; Matear, 2021[17]; Martin, 2020[18]).

31. Much of the promise of digital education technologies rests on their capacity to enable more individualised forms of instruction and assessment that are responsive to students' needs, abilities and interests. It also hinges on the ability of educators to use digital technologies to promote student engagement and make their own work more efficient (Ganimian, Vegas and Hess, 2020[2]). Yet, the actual use of education technologies remains, in many cases, far removed from this "possibility frontier." Although an increasing number of educators and students make use of digital tools, much fewer embrace them as a vehicle to engage in a more individualised, engaging or responsive pedagogy.

32. This analytical dimension focuses on the levers that policy makers have at their disposal to help bridge this gap and promote more effective uses of digital technologies for teaching and learning. It considers policies to support the development and selection of suitable digital education technologies as well as the dissemination of effective pedagogical practices involving digital tools. It also examines the adaptation of curricula and assessment frameworks and strategies to overcome barriers that have so far limited the take-up and effective use of digital technologies for teaching and learning.

33. Relevant questions for this dimension include:

- How can educators be supported to select digital education technologies in line with their students' needs and to successfully integrate them into their teaching?
- How can good practices and innovations concerning the use of digital education technologies be captured and spread systematically?
- Do curricula give adequate weight to the development of digital skills?
- Do curricula provide sufficient latitude and support for educators to integrate digital technologies effectively into their teaching?
- Are assessment frameworks adapted to the use of digital assessment methods and suited to assess learners' acquisition of digital skills?
- How can formative and summative assessment practices leverage the potential of digital technologies?

Governance, guidance and regulatory framework for digital education

34. This analytical dimension examines the design of a fit-for-purpose policy framework that can guide digital education and adapt it to evolving needs, while permitting the protection of learners and underpinning an effective use of digital technologies in teaching and learning. The digital transformation in education requires ongoing policy efforts to provide guidance, and design standards and regulations (when absent). Accounting for the specific education governance environments arrangements in which digital education policy efforts are introduced is crucial. In turn, this requires a reflection on the distribution of roles and responsibilities in the education systems for digital education and on the implications of the digital transformation of education for existing governance arrangements. A fit-for-purpose policy framework for digital education is also one that designs the participatory mechanisms to leverage the involvement of all digital education stakeholders and ensure they can meaningfully contribute to seizing the potential of digital technologies in education systems.

35. The provision of guidance, standards and formal regulations can guide digital education and permit a safer and more effective use of digital technologies in education systems. Increasing cyber security risks,

concerns about learners' data protection, and potential bias of algorithms used in educational processes raise the need for closer attention to the design of guidance for compliance with existing digital security and data protection frameworks, as well as need for regulation in areas that currently remain largely uncovered. This analytical dimension examines the provision of guidance (e.g. through standards – including minimum standards where relevant, guidelines, and recommendations) and formal regulations (with an associated legal obligation) to enable an efficient and safe use of digital education technologies. Public bodies need to provide support and guidance to education institutions as they make investment decisions in digital education infrastructure or seek to comply with existing digital security and data protection frameworks. The design of interoperability frameworks and support for their implementation can be critical in enhancing interoperability among digital learning environments. In addition, as educational technologies constantly evolve and new tools emerge, continuous regulatory efforts are also required to ensure digital learning environments respect the privacy of learners and avoid inequitable practices (e.g. algorithmic bias).

36. Quality standards and guidelines for digital education can also support institutions in making effective use of digital technologies that translate into better student outcomes. Indeed, a supportive quality assurance framework not only ensures that minimum standards are met in digital education activities, but also enables a more effective use of digital technologies in teaching. This requires developing a coherent quality assurance approach for digital education, clarifying focus areas to be covered as well as the intended use of the evaluation results (for accountability, identifying and promoting good practices and improving provision where it does not meet the required standards). There is also a need to ensure synergies and articulations between processes and tools to ensure coherence and consistency. International cooperation and coordination regarding standards-setting for digital education technologies can be part of the solution.

37. Supporting a more effective and safe use of digital technologies in education systems also requires addressing the governance implications of increasingly digitalised schools and growing reliance on hybrid learning. While much attention has been paid to examining students and teachers' use of digital technologies, relatively less is known about how digital technologies arrive in the classroom. This requires investigating patterns in the planning of digital technologies' use (including who defines targets; the distribution of responsibility at different levels of the system in digital technologies' purchases, use and monitoring) and how these interact with the existing governance arrangements and policy-making processes in education systems. This analytical dimension thus explores the roles and responsibilities for making decisions about the use of digital technologies in school education, focusing on: i) the institutional arrangements and types of agents/institutions with responsibilities for digital education, ii) the allocation of roles and responsibilities for setting priorities and targets, funding, acquisition, selection, providing access, use and standard setting for digital technologies (at different levels of the systems) and the iii) distribution of responsibilities across different levels of the system.

38. Digital education involves by nature a multiplicity of stakeholders and policies need to leverage the broader learning ecosystem for an effective use of digital technologies in school education. Stakeholder engagement for digital education can thus serve diverse purposes: facilitate innovation (e.g. private companies, universities and research centres), accompany children in the use of digital technologies for learning (e.g. families), enable the acquisition of digital technologies (e.g. local authorities). This analytical dimension examines the rules, procedures and participatory mechanisms for stakeholder engagement (depending on stakeholder type and education level), and successful models of stakeholder engagement for digital education.

39. Relevant questions for this analytical dimension include:

- How can education systems build a regulatory framework, design guidance and institutional capabilities that enable the protection of learners and ensure the quality of digital education?

- How can the regulatory framework for digital education be designed and maintain the flexibility to adequately steer the use of fast-evolving technologies?
- How can education systems address the governance implications of increasingly digitalised schools and growing reliance on hybrid learning?
- How can education systems best engage different stakeholders to help achieve the potential of digital technologies in education?

Infrastructure and innovation for digital education

40. The success of digital education strategies hinges upon wide and equitable access to the benefits of digital technologies. Indeed, all students, teachers and schools should have access to at least a minimum extent to quality digital technologies that are a prerequisite for digitally-enabled education systems. This analytical dimension thus examines the availability and adequacy of the digital technologies for education, with a focus on whether such technologies are accessible, equitably distributed (e.g. across education institutions and students.) and of high quality (e.g. in terms of computing power). It thus puts a focus on the mechanisms governing the distribution of digital resources across the education sector and the extent to which they allow achieving desired policy targets (e.g. equity, performance). This dimension also considers how policy makers might foster innovation in digital education technologies to reap the full benefits of cutting-edge digital tools for enhancing teaching and learning practices.

41. Securing reliable connectivity for all is the foundation of digital education. Ensuring quality and equity in schools' Internet access and learners' home Internet access requires a combination of overarching policies to promote and facilitate broadband deployment and foster competition between providers, and more targeted efforts by education ministries. Such efforts can include the provision of funding to education institutions for affordable broadband, support for an increase in Internet reach in schools located in areas unlikely to benefit from commercial investment and leveraging innovative uses of a mix of technologies to provide connectivity for learners or schools in very remote locations. Support for students with poor Internet access can also include expansions in financial aid packages to cover connectivity needs or the provision of data package subscriptions to learners or families lacking Internet access.

42. Beyond connectivity, there is also a need to ensure widespread access to quality digital equipment (hardware and software), tools and services. Indeed, the quality of digital equipment matters for its use and the effectiveness of the digital education ecosystem. Successfully targeting equipment gaps requires a comprehensive policy approach with a strong capacity-building component targeted at educational institutions, teachers and students. Building partnerships with a range of stakeholders (e.g. private sector, statistics institutes, and local communities) and mobilising knowledge networks are further strategies that can equally support efforts to bridge equipment gaps. Attention may need to be placed on quality evaluation and monitoring, anticipating maintenance and upgrading costs as well as investment needs before shortages or inadequacies arise.

43. A forward-looking approach to school digitalisation requires policy makers not only to ensure the access to quality digital infrastructure today, but also push the boundaries of how digital tools can support teaching and learning in the future. Innovation for digital education builds on investment and synergies between public and private actors to support a vibrant educational technology sector that creates the tools, products and services which meet learners needs and enhance their outcomes. Governments play a key role in creating the conditions that can promote innovation in digital education technologies, including through general policies to stimulate entrepreneurship, and stimulating both public and private investment in the development of such technologies. Providing support to access finance and business investment, setting up innovation funds and providing grants for digital education technologies development and innovation, supporting educational technology incubators or accelerators, are among the policy levers that governments may consider developing to sustain a dynamic educational technology sector. Governments

may also aim for monitoring of investment and developments in the educational technology industry to ensure sufficient investments, as well as inform and target innovation-related policies for digital education technologies.

44. Relevant questions for this dimension include:

- How can education systems support access to fast and reliable Internet connection for all schools, teachers, and students?
- How can education systems provide access to quality digital education equipment (hardware and software) in schools and at home for all learners while anticipating further investment and maintenance needs?
- How can education systems stimulate investment in and support innovation for digital education technologies, including hardware, software, and services?

Resourcing the deployment of digital education technologies

45. The effective deployment of digital education technologies in education institutions requires both financial and human resources. While the preceding dimension (Infrastructure and innovation for digital education) focuses on providing the infrastructural preconditions for digital education (e.g. broadband connectivity and access to digital equipment in education institutions and for learners), this dimension addresses how institutional funding and human resource policies can be adapted to support access to digital education technologies and their effective use for teaching and learning in education institutions. Both institutional funding mechanisms and human resource frameworks are integral parts of the wider policy ecosystem required to pursue policy objectives for digital education.

46. Institutional funding frameworks need to provide schools with the resources they need for the acquisition and deployment of digital education technologies, in line with policy objectives. To do so effectively, funding and revenue models may need to evolve and adapt to the particularities of digital education technologies. This includes, for example, a reflection on the recognition of new modes of education participation (e.g. enrolment in digital education programmes) for core institutional funding and student aid. Funding allocation mechanisms also need to be adapted to the nature of digital investments, which often comprise a mix of upfront capital investments and recurrent expenditure, address potential equity issues in access to digital education technologies, and reflect governance and decision-making arrangements in order to effectively steer investment decisions.

47. The education professionals working in schools need to be supported to make effective use of digital education technologies. Human resource policies and educators' working conditions can either facilitate or hinder their contribution to the digital transformation of education institutions. Designing conducive human resource frameworks for the digital age may provide career structures and progression criteria that incentivise educators' and institutional leaders' engagement in digital education. This may also involve explicitly recognising the skills educators acquire while using and developing digital learning materials or the large upfront time investment needed to integrate digital technologies into teaching practices. Rethinking educators' workloads and working time arrangements is another lever for policy makers to encourage the deployment of digital education technologies.

48. Relevant questions for this dimension include:

- Are institutional funding framework adapted to new modes of teaching and learning enabled by digital education technologies?
- Are education institutions enabled and incentivised to invest in digital technologies in line with their students' needs as well as system-wide goals?
- How to best stimulate and incentivise teachers' and institutional leaders' engagement in digital education?

- What policies can help educators to overcome time constraints and other barriers that inhibit their effective engagement with digital education technologies?
- What professional roles and skills are needed in education institutions to foster the take up and effective use of digital education technologies (e.g. IT resource librarians, IT specialists etc.)?

Capacity-building for digital education

49. Reaping the potential of digital education technologies to enhance teaching and learning requires, above all, education professionals who are motivated and prepared to put digital technologies to effective use. Capacity building efforts are therefore a critical component of successful digital education strategies. This analytical dimension is concerned with the policy levers that governments have at their disposal to strengthen the capacity for effective digital education at all levels of the education system: among educators, among education institutions, and among actors across the wider education ecosystem (including parents and administrators).

50. To enhance teaching and learning using digital education technologies, educators need the capacity to integrate, optimise and transform digital resources in different pedagogical processes and activities (European Commission, 2020[19]; Redecker, 2017[20]). This requires educators to have sufficient Technological Pedagogical and Content Knowledge (TPACK) as well to be supported in using this knowledge to develop suitable context-specific teaching strategies (Ulferts, 2021[21]; Willermark, 2018[22]). It also requires systems to ensure that educators feel prepared and motivated to make effective use of digital education technologies. To address this challenge, the dimension considers a range of policy levers to strengthen educators' capacity, ranging from their initial education and continuing professional learning (including the support of peer learning and communities of practice) to the structural supports that could encourage a more widespread take-up of DET in schools.

51. At the institutional level, the capacity to effectively incorporate digital technologies hinges on schools' access to digital technologies, effective leadership, and the extent to which their culture and policies support the effective integration of technology in teaching and learning practices (Costa, Castaño-Muñoz and Kampylis, 2021, p. 2[23]; Castaño Muñoz, Pokropek and Weikert García, 2022, p. 5[24]). This dimension therefore considers how governments can provide education institutions with guidance, support their leadership and strengthen their ability to engage in institutional improvement strategies in the area of digitalisation.

52. In addition to educators' and institutions' capacity, this analytical dimension considers how policies can strengthen digital capacity across the wider learning ecosystem. This includes administrative capacity at the central and intermediate levels of government, but also – in the case of younger learners – parents and other stakeholders who can facilitate and shape students' engagement with digital technologies for learning at home.

53. Relevant questions for this dimension include:

- How can teachers' skills for the effective use of digital technologies be strengthened during their initial education and continuing professional learning?
- How to support school leaders in self-evaluation and school improvement efforts focused on advancing the digital transformation of their schools?
- How to guide students in their use of digital technologies and strengthen the capacity of parents and caregivers to act as digital education facilitators?
- How can central and local administrations leverage the potential of digital education technologies and support schools in their use?

Monitoring and evaluation for digital education

54. As explained in the outset of this report, digitalising education systems is not a goal in itself but valuable insofar as it helps to enhance quality, equity and efficiency in education. Ensuring that digitalisation policies meet these ends requires more information on the progress of education digitalisation and its impact on learner and other desired education outcomes. In this context, this dimension discusses how governments can best monitor the state of digitalisation in education and evaluate the effects of their policies across all dimensions of digital education.

55. For the purpose of this dimension, **monitoring** is understood as the systematic collection of performance data that can be used to track the progress of policies and the achievement of policy objectives in order to identify relevant system challenges and weaknesses. Policy **evaluation**, on the other hand, regards the structured assessment of the design, implementation and results of a specific policy intervention and serves for the purpose of accountability and learning about the impact of individual policies (OECD, 2019[25]).

56. A well-designed monitoring and evaluation framework can helpfully guide policy development and implementation on the use of digital technologies in education. While countries may pursue different rationales or objectives in their digital education strategies (depending also on their education systems' state of digital development), a comprehensive monitoring and evaluation infrastructure that is aligned with a country's strategic vision for digitalisation is key to assess progress towards policy objectives and identify potential implementation challenges.

57. Currently, substantial information gaps exist in national evidence infrastructures regarding the effective use of digital technologies in education, the presence of the necessary preconditions and equipment, the human and institutional capacities for digital education and effective regulation of digital education. These information gaps have emerged for many reasons, including the relatively low policy priority attached to digitalisation in education systems until recently, the difficulty of arriving at common understanding and definitions related to digitalisation, and a lack of information on how users are integrating technology into teaching and learning processes (OECD, 2021[16]).

58. In the light of scarce information, this dimension shall examine and suggest a range of sources that governments could use to develop monitoring and evaluation infrastructures such as international indicators and institution-level external evaluation reports. It shall also highlight several ways in which governments can close information gaps and strengthen the evidence base around digital education. This includes instrumentalising national data collections, engaging in systematic knowledge mobilisation or investing in new research.

59. Relevant questions for this dimension include:

- What information on the state of digitalisation is currently available along the different policy dimensions of digitalisation in education?
- How can governments take a systematic and holistic approach to monitoring and evaluation?
- Which existing sources of information could governments draw on to monitor education digitalisation and how can they close current data gaps?
- What is the state of evidence on the effectiveness of digitalisation and how might governments go about strengthening this evidence base?

Digital education outcomes

60. Digital education technologies have the potential to enhance teaching and learning on multiple dimensions if enabling conditions are in place to support their effective use. Indeed, digital education outcomes depend on the extent to which policy supports:

- the expansion of **access** while addressing **equity** issues, by ensuring wide and equitable access to digital education technologies and ensuring equity in outcomes from learning with digital education technologies;
- the enhancement of **quality** and **relevance of education provision**, by ensuring quality of learning and socio-emotional outcomes from learning with digital education technologies, and fostering the use of relevant and impactful pedagogies and teaching practices, adapted to the needs and profiles of diverse learners;
- improvements in **efficiency** in education provision, by enhancing efficiency in the use of digital education technologies and managing related trade-offs.

61. When successfully deployed, digital education can support a range of student outcomes. Indeed, the use of digital technologies in education should not be the outcome per se, but digitally-enhanced education should serve the broader goals and objectives of education systems. Digital tools provide education systems with new ways to fulfil these aims whilst fostering equity, efficiency and quality in education. At the same time, the digital transformation of economies and societies itself changes the mandate of education systems. Digital education and the use of digital technologies for teaching is crucial to allow education systems to cater these new needs and prepare students for the challenges they will face in fast-evolving economies and societies.

62. Over the past years, the demand for skills has changed fundamentally. Digital skills and competencies have become crucial in labour markets and everyday lives (OECD, 2019[6]). There has also been increased awareness for the importance of socio-emotional skills as strong predictors of well-being, education and labour market outcomes and the role of education in fostering these skills (OECD, 2021[26]). Even within the domain of cognitive skills – which have conventionally formed the core of education provision – there have been considerable shifts as analytical thinking skills, problem solving skills and creative thinking skills increasingly overshadow traditional knowledge acquisition skills (World Economic Forum, 2020[27]) (OECD, 2019[6]).

63. Digital tools can provide key avenues to foster these skills. For instance, there is clear evidence that the use of digital technologies in education can enhance students' digital skills (Malamud and Pop-Eleches, 2011[28]; Malamud et al., 2018[29]; Bulman and Fairlie, 2016[8]). At the same time, innovative education technologies such as gamification or AI-based learning have been identified as promising with respect to developing and assessing a range of cognitive and socio-emotional skills which have previously found little response in conventional curricula and pedagogies (MGIEP, 2020[30]; OECD, 2021[15]). However, previous analysis indicates that not all uses of digital technologies are conducive to learning outcomes, and promoting access to digital equipment alone is insufficient for enhancing learning outcomes (Bulman and Fairlie, 2016[8]; OECD, 2019[6]; OECD, 2022[31]). Seizing this potential depends on how technology is being used in the teaching and learning process and the underlying pedagogical intent, and evidence from OECD countries shows that a conducive digital education policy ecosystem can enable more effective and innovative uses of digital technologies for learning and teaching (OECD, 2022[31]).

64. Beyond the development of a range of skills, digital education can also help support students' well-being in a digital world. In the digital age, students' well-being is frequently at risk of being compromised by adverse uses of digital technologies. Increased screentime leading to lower physical activity, cyber-bulling and risks to student privacy online have marked core concerns of education systems across OECD countries (Burns and Gottschalk, 2019[32]). Educating students on responsible and safe usage of digital technologies thus becomes highly relevant to address the risks of digital technologies for student well-being. For instance, digital skills help children to cope better with cyber-bullying (Gottschalk, 2022[33]). Students who have benefited from digital education have also proven more able to tackle disinformation and distinguish fact from opinion (OECD, 2021[7]). In adulthood, high levels of literacy, numeracy and problem-solving skills in technology-rich environments increase the likelihood that adults

take action to enhance their security on line (e.g. by managing access to their personal information, using anti-tracking software or changing settings to limit cookies) (OECD, 2019[6]).

65. Going beyond individual level outcomes, digital education is also crucial to realise broader social outcomes such as social inclusion. In a digital world, digital skills enable individuals to take part in a range of everyday social and economic activities. The pandemic has led to a flight of private and public services to the digital space. At the same time, online networks have moved to the centre of our social lives. Digital literacy thus becomes increasingly essential for taking part in modern economies and societies and untapping the benefits of an increasingly digital world (OECD, 2019[6]). Furthermore, digital tools also have the potential to advance educational inclusion. For instance, new analytical tools and personalised learning technologies can enable educators to respond to each student's needs, adapt their teaching to different learning styles, abilities and interests, and provide additional support to students who might otherwise fall behind. Further, various types of assistive technologies have been designed to increase, maintain, or improve the functional capabilities of children with special education needs (SEN) and can allow them to take part in learning interactions from which they were previously excluded (U.S. Department of Education, 2015[34]; Brussino, 2020[35]). Technological advances have also facilitated the diagnosis of special education needs in a number of domains.

66. Lastly, digital education can promote inclusion in labour markets**.** There is long standing evidence that technological changes over the past decades have led to growing returns to skills (Berman, Bound and Machin, 1998[36]). Work in the digital economy is moving away from low-skilled routine tasks and increasingly demands ICT-based non-routine labour. Beyond digital skills, these trends require a broad spectrum of cognitive and socio-emotional skills to adapt to a fast-moving professional environment (OECD, 2019[6]). Changing skill demands have not only widened wage inequalities over the past decades, if they go unmet, they might also stand in the way of economic growth and development. In fact, recent labour market analysis of job postings in a range of EU countries points at significant mismatches in supply and demand for digital skills (OECD, 2022[37]). Broadly advancing digital literacy and leveraging digital technologies to foster a wealth of cognitive and socio-emotional skills is thus essential to promote economic growth and inclusion.

67. Overall, the analysis to be conducted under this proposed framework acknowledges the multivarious ways in which digital education can impact broader education outcomes and examines digital education policies with respect to their contribution to skill development, well-being, social and labour market outcomes.

Proposed methodology

68. This section presents the proposed methodology for the project on *Policies for the Digital Transformation of School Education*, which is designed to support countries in designing a comprehensive and coherent policy ecosystem to adapt their school systems to the needs and demands of the digital age. It describes the different ways in which countries can participate in the project and provides a detailed description of its main components, methods, governance, timeline and cost.

Main components of the project

69. The proposed methodology for the project on *Policies for the Digital Transformation of School Education* is designed to examine country-specific issues and policy approaches to the digital transformation of school education and placing these experiences within a broader analytical framework and structured peer learning to generate insights that are relevant to both participating countries and the OECD as a whole. To do so, the methodology combines desk-based analysis, the development of an analytical framework and policy survey with an opportunity for countries to engage in peer learning and

collectively reflect on policies for the digital transformation of education in meetings of the GNE on School Resources and series of Symposia. In addition, the project proposes tailored peer learning activities and policy advice to interested countries in the form of policy diagnoses and country reviews on policies for effective digitalisation. A comparative report will synthesise findings in 2025-26.

Development of a holistic analytical framework

70. In a first analytical phase, the OECD Secretariat engages in desk-based analyses to develop a holistic framework for a system-level approach to digitalisation – whose proposed draft is outlined above – drawing on international data, research and analysis. The analytical framework shall serve to provide guidance and a comparative structure to underpin country-specific work. The proposed analytical framework above was informed by synthesis work carried out in collaboration with the European Commission on the Enabling Factors for Digital Education and Skills (EFDES) during 2022-23. This first phase of the project shall also serve to identify key policy issues and questions for analysis as well as the gaps in the international knowledge base that the Project should seek to address. The Secretariat will finalise the analytical framework based on the feedback on the above proposal received at the 8th meeting of the GNE-SR on 16-17 March 2023.

Policy survey and comparative stock-take

71. There is significant heterogeneity among countries' digital education policy ecosystems and their approaches to the digital transformation of school education. To collect more detailed comparative information on these policies, the Secretariat proposes to design and conduct a policy survey based on the analytical framework – jointly with the complementary project on *Policies for a Future-Ready Teaching Profession in the Digital Age* (Strand 2) [EDU/EDPC/SR(2023)3] – among OECD countries and other participating countries. As this activity will be covered by Part I funding, it will be open to all countries, yet participation in the survey will be voluntary and every effort will be made to reduce the reporting burden on countries.

72. The survey will be designed to be complementary to the data collected through the OECD's Indicators of National Education Systems (INES), PISA and TALIS, with a focus on policies. The survey will also complement questionnaires on digital education infrastructure and on the governance of education data and digital technology administered by the OECD/CERI project on "Smart Data and Digital Technology in Education," to avoid duplication. The data collected through the survey will inform the project's country-specific and comparative analyses, and enable a mapping of countries' status along a digital transformation spectrum in a range of policy areas.

Peer learning events

73. Over the course of the project, the Secretariat proposes to organise peer learning events focusing on specific policies, promising practices or challenges that countries face in the digital transformation of their school systems. These could take the form of meetings of the Group of National Experts on School Resources, webinars organised for all countries based on deliverables from the project, or more structured and tailored country-specific peer learning conversations.

Meetings of the Group of National Experts

74. The OECD Secretariat will convene regular meetings of the Group of National Experts on School Resources (GNE-SR) to inform meeting participants about the Project's progress. The meetings will also facilitate peer exchange and allow countries to share lessons and experiences related to the digital transformation of school education (Strand 1) and the teaching profession in the digital age (Strand 2). The meetings will also serve to guide the methods, timing and principles of the project and to provide feedback

on its comparative outputs. Participation in the GNE meetings will be open to all OECD member countries, participants to the Education Policy Committee, the Trade Union Advisory Committee to the OECD (TUAC) and Business at OECD (BIAC) and, by invitation, to other interested countries.

Webinars

75. Webinars would be open to all participating countries and could be organised to discuss pieces of work delivered by the project (e.g. working papers or policy briefs developed as part of Part I funded activities, or the release of a country review). The webinars would allow for the Secretariat's presentation of deliverables and offer a framework for international peer learning and for international policy makers to share their countries' experience with the issues discussed, related challenges and policy initiatives.

Peer learning conversations to identify and/or discuss promising policies and practices

76. Subject to the availability of VCs, the Secretariat proposes to organise structured peer learning conversations between a small number of countries on policy issues of their choice. A peer learning conversation is initiated at the request of a country (or a small number of countries) to meet the knowledge needs of national stakeholders who want to understand how other countries are addressing policy challenges that they face, or the policy options other countries have debated and adopted. This involves a single country (or a small number of countries) selecting a set of peer countries to gain in-depth knowledge of the experience of selected countries on a specific policy issue of their interest. The project will do this by preparing background information and country briefings, and by moderating the discussion. Each peer learning conversation is then summarised in a policy brief for wider learning among all countries, including a description of promising policies and practices related to the policy issue discussed.

77. The conversation itself will be organised as a facilitated discussion in which country participants will be able to informally and collaboratively exchange and discuss their reform plans or policy practices. They would focus on issues that are presently areas of inquiry, uncertainty, recalibration, or doubt, and for which there is not necessarily an established and conclusive research base. An additional benefit of these peer learning conversations will be to enrich the stock-take of policies and to feed into the comparative analysis and final comparative report.

Country-specific diagnoses and reviews

78. Countries interested in an in-depth analysis of their policies will be invited to request tailored analyses of their digital education policies in the form of targeted diagnostic reviews or more in-depth country reviews (see details on the levels of participation below). Both provide value to the participating country as well as the Project's comparative work. Country-specific work involves an OECD-led review team visiting the country, meeting with stakeholders and analysing the digital transformation of the school system and delivering a diagnosis of its strengths, challenges, weaknesses and opportunities related to a specific issue of interest (in the case of the diagnostic reviews), or an in-depth analysis of the entire digital education policy ecosystem and detailed policy recommendations (in the case of a full country review).

79. The scope and focus of diagnoses and reviews will be determined by the country in consultation with the OECD, depending on the country's priorities and needs, and guided by the analytical framework. Each diagnosis or review will include an intensive country visit and interviews with all major stakeholders to enable the OECD-led review team to gain a good understanding of the country's context, policies and practices. The country-specific work will culminate in a diagnostic report or country review report on which the country will have an opportunity to provide comments prior to its finalisation and publication. The costs of country diagnoses and reviews would be covered by Voluntary Contributions (VCs) provided by the countries reviewed.

Synthesis phase and final comparative report

80. Subject to a critical mass of country participation, and if the EDPC agrees to include the Project in the 2025-26 PWB along with dedicated central OECD (Part I) funding, the Project's findings will be synthesised in a comparative report in 2025-26. The final report will provide comparative information on countries' policy approaches to the digitalisation of education, common challenges they face and promising practices identified over the course of the Project. It will cover any Strand in which at least 5 countries participated in 2023-26. The report will serve as a resource for policy makers, educational leaders, teachers and the research community. The final comparative report will complement the 2023 publication *Enabling Factors for Effective and Equitable Digital Education: State of Play and Promising Policies* (working title), which describes the main policy challenges countries face with respect to digitalisation and surveys the evidence base on effective practices and knowledge gaps for the project to address.

Modes of participation

81. Participation in the OECD Project is open to OECD member countries, participants to the Education Policy Committee as well as other countries at the invitation of the GNE-SR. Participating countries can choose between several modes of involvement, depending on their desired level of engagement and the outputs they seek:

Participation in GNE meetings

82. At the minimal level of engagement, countries can participate in the regular meetings of the Group of National Experts on School Resources (GNE-SR) and any webinar organised by the Secretariat to disseminate and discuss a given deliverable of the project (e.g. working paper, a country review). These peer learning activities are covered by Part I funding and entail no additional costs for countries.

Contribution to the policy survey

83. Countries can complete the policy survey on digital education policy prepared by the Secretariat to showcase their digital education policy ecosystem and benchmark themselves against other participating countries. This activity is also covered by Part I funding and entails no additional costs for countries.

Commissioning of a peer learning conversation

84. This mode of participation entails the commissioning of a peer learning conversation event by interested countries, on a topic of priority to them, in order to learn from countries of their choice. These activities are subject to the availability of VCs, hence this level of engagement entails additional costs for countries.

Diagnostic review with limited scope

85. This mode of participation entails the preparation of responses to a targeted OECD questionnaire focusing on selected parts of the analytical framework, a diagnostic visit by an OECD expert team, culminating in a workshop to present initial diagnosis findings (with a focus on strengths, weaknesses, challenges and opportunities in the thematic areas under focus), as well as the delivery of a short diagnostic report within 2 months to support policy debates. These activities are subject to the availability of VCs, hence this level of engagement entails additional costs for countries.

In-depth country review with policy recommendations

86. This mode of participation entails the preparation by countries of responses to an OECD questionnaire covering the full analytical framework, a review visit by an OECD expert team, and the delivery of an in-depth country review report with in-depth analyses and targeted policy recommendations within 6-9 months. These activities are subject to the availability of VCs, hence this level of engagement entails additional costs for countries.

Provisional timeline

87. The timeline will unfold as follows:

- The analytical framework for Strand 1 and the policy survey will be prepared and administered in 2023.
- Peer learning events and country-specific work will be offered from the second half of 2023 until 2026.
- Strand 1 of the project is expected to end in 2026. Strand 2 could end either in 2024 or 2026, depending on the extent of country participation.
- A final comparative report will be developed in 2025-26, which will cover any Strand in which at least five systems participate.

Outputs

88. This project on *Policies for the Digital Transformation of School Education* (Strand 1) will produce several outputs:

- A holistic framework for a system-level approach to digitalisation.
- A stock-take overview of policies on digital resources (based on a policy survey), enabling a mapping of countries' status along a digital transformation spectrum in a range of policy areas.
- Policy briefs on key thematic areas.
- Peer learning events focusing on specific policies and/or lessons learned in systems.
- Peer learning conversations in areas of priority to participating countries (subject to VCs).
- Country-specific policy diagnoses based on diagnostic review work (subject to VCs).
- Country-specific policy review reports with recommendations based on in-depth review work (subject to VCs).
- A final comparative report if at least 5 systems participate in this Strand 1 project in 2023-26.

Governance

89. Both Strands of the OECD Project on *Resourcing School Education for the Digital Age: Effective Digitalisation and Future-Ready Teachers* will be overseen by the Education Policy Committee (EDPC) and the Group of National Experts on School Resources (GNE-SR). The Project is designed to deliver Output 2.1.1.2.4 of the EDPC's 2023-24 Programme of Work and Budget (PWB) [EDU/EDPC/CERI(2021)3]. Over the course of the project, the OECD Secretariat will organise regular meetings of the GNE-SR with country delegates to guide the Project. Progress on the Project will be reported back to the Education Policy Committee at regular intervals using the framework established for all outputs. The Committee will also be invited to comment on drafts of work published as part of the Project.

Cost

90. OECD central (Part I) funding was allocated for this Project for the EDPC's 2023-24 PWB. This will support the analytical work undertaken in preparing the study and the thematic comparative analysis that can serve as a common resource for all countries – whether they participate more actively in the Project or not. It will also support the organisation of meetings of the GNE-SR and the dissemination of the Project's findings through webinars.

91. Country-specific work, such as peer learning conversations, country diagnoses and country reviews, are covered through Voluntary Contributions (VCs). It is proposed that the cost of a peer learning conversation is set at EUR 35 000 per country, the cost of a country diagnosis is set at EUR 150 000 per country and the cost of a country review is set at EUR 220 000 per country.

92. Countries would also meet the costs of preparing questionnaire responses in preparation of country-specific work as well as the costs of participating in project meetings and peer learning events. For countries opting for a country diagnosis or country review, internal travel costs of the visit team (within the country during the visit) as well as potential interpretation costs would need to be covered separately by the country.

Dissemination and target audience

93. The project's findings will be disseminated through a range of channels: Regular meetings of the GNE on School Resources; peer learning events; the project webpage and blog posts. These dissemination channels will ensure that the findings will reach a wide range of stakeholders: education authorities; stakeholders at system and school levels; researchers; private sector organisations working on digital resources; and international organisations.

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