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Preparing teachers for digital education

Continuing professional learning on digital skills and pedagogies

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Abstract

The effective use of digital resources in schools requires not only technological infrastructure, but also human capacity. Teachers need to be prepared to unlock the potential of education technology, to enhance students' learning outcomes and to protect them from risks in an increasingly digital learning environment. This policy paper discusses how continuing professional learning (CPL) can prepare teachers for these challenging new tasks. Drawing on insights from PISA 2022 and comparative data collected through the Policy Survey on School Education in the Digital Age, this policy paper addresses the following questions: Do teachers have the skills they need for effective digital education? How can CPL support teachers' effective use of digital resources? Which CPL formats are most effective and what mechanisms can help to ensure the quality of CPL for digital education? How can policy makers encourage teachers' professional learning on digital education?

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Executive summary

The COVID-19 pandemic has accelerated the digital transformation of education systems around the world and demonstrated that the effective use of digital education resources does not only require technological infrastructure, but also human capacity. Above all, teachers play a critical role in shaping students' education outcomes in increasingly digital learning environments, in exploiting the benefits of education technology and in protecting students from the risks of digital resources. Experience has shown that effective digital education requires the careful adaptation of pedagogical approaches rather than a reproduction of traditional teaching practices in a digital format. This policy paper discusses how continuing professional learning (CPL) can prepare teachers for these challenging new tasks. Drawing on insights from PISA 2022 and comparative data collected through the Policy Survey on School Education in the Digital Age, this policy paper presents evidence and policy examples addressing the following questions:

1. Do teachers have the skills they need for effective digital education?
2. How can CPL support teachers' effective use of digital education resources?
3. What CPL formats can be used to prepare teachers for the use of digital education resources?
4. How can policy makers encourage teachers' professional learning on digital education?
5. What mechanisms can help to ensure the quality of CPL for digital education?

Despite many countries' significant progress in the digital transformation of school education, evidence from PISA 2022 points to persistent gaps in teachers' confidence to use digital resources effectively in the classroom. CPL, if designed effectively, can help to close this gap and equip teachers with the skills they need to seize the opportunities of the digital age. CPL on digital education is therefore an important policy priority and results of the Policy Survey show that many education systems have introduced reforms to strengthen teachers' digital competency in recent years.

Empirical evidence suggests that professional learning is most effective when it is embedded, content-focused, sustained and collaborative. Professional learning policies increasingly reflect this insight. Almost half of the jurisdictions participating in the Policy Survey report that they support teachers' peer learning on the use of digital resources and recognise new training formats, such as MOOCs or micro-credentials. While results of the Policy Survey indicate that few education systems require teachers to participate in CPL on digital resources, countries have introduced a range of measures to incentivise and support teachers' training. This includes the provision of free training courses as well as the recognition of teachers' digital skills or participation in relevant CPL in career progression and appraisal frameworks.

Ensuring the quality and relevance of CPL on digital resources remains a challenge, given its decentralised development and a frequently fragmented landscape of training providers. Results of the Policy Survey indicate that education systems have sought to address this issue using a variety of quality assurance mechanisms. Competency frameworks on teachers' digital skills and the accreditation of training programmes on digital education resources are particularly widespread. By contrast, few countries have undertaken efforts to certify teachers' digital skills directly.

Professional learning will remain indispensable to equip educators with the skills they need to promote effective learning in an increasingly digital world. Emerging technologies, including generative artificial intelligence, call for renewed efforts to provide educators with attractive and effective opportunities to

update their technical and pedagogical skills for digital education. By providing an overview of the empirical evidence, promising practices and the policy landscape surrounding teachers' professional learning on digital resources, this policy paper supports further efforts to strengthen teachers' skills for the digital age.

1. Introduction

This is the first in a series of policy papers developed in the context of the OECD umbrella project *Resourcing School Education: Policies for the Digital Transformation of Education and Future-Readiness of Teachers* (OECD, 2025[1]). The policy papers draw on insights from the project's *Policy Survey on School Education in the Digital Age* (Boeskens and Meyer, 2025[2]) and additional data sources to provide a more in-depth discussion of evidence and country practices related to selected policy issues covered by the project's analytical framework (see Annex A). This policy paper focuses on teachers' continuing professional learning (CPL) and how it can prepare teachers for the effective use of digital education technologies.

2. Some teachers still lack the skills needed for effective digital education

Data from the 2022 Programme for International Student Assessment (PISA) highlight a stark increase in the use of digital technologies for education compared to pre-pandemic levels. On average across OECD countries, students reported spending 3.1 hours per day on digital devices at school (2.0 hours for learning activities and 1.1 hours for leisure), which amounts to 60% of the time they spend in regular lessons per school day (OECD, 2023, pp. 195, Figure II.5.15.[3]). Yet, evidence suggests that not all uses of digital technologies have a positive effect on learning outcomes and highlights the importance of teachers' ability to use digital education resources effectively (OECD, 2023[4]). Teachers also play a key role in fostering students' digital skills and students' performance in computer problem solving and computer mathematics is positively correlated with their teachers' problem-solving skills in technology-rich environments (OECD, 2019, p. 201[5]). Preparing teachers to use digital education resources effectively is thus instrumental in building students' digital skills and supporting their learning in an increasingly digitalised world.

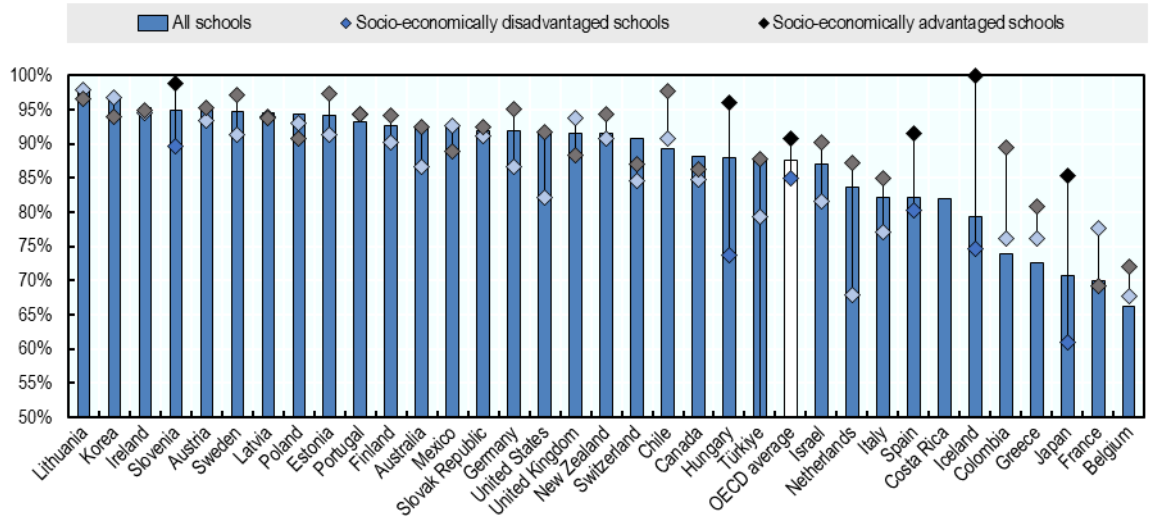
Teachers have made significant progress in their use of digital technology in recent years. Between 2018 and 2022, the share of 15-year-old students whose principals reported that their teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction rose from 64.5% to 87.6%, on average across OECD countries (OECD, 2023, pp. 409, Table II.B1.5.32[3]). Nevertheless, in some countries, significant gaps in teachers' digital skills remain. For example, in Belgium and France, at least 30% of students attended schools whose principals reported that teachers lacked the necessary skills to integrate digital devices. (In contrast with Austria, Ireland, Korea, Latvia, Lithuania, Slovenia and Sweden, where only up to 5% of students did) (Figure 1).

Despite the encouraging progress in teachers' digital competency reported by principals, evidence also suggests that a sizeable proportion of teachers are still hesitant to use digital resources in ways that could transform teaching and learning. In most countries that participated in the PISA 2022 Teacher Questionnaire, the majority of teachers reported making little use of digital technologies to enhance student learning in the classroom and primarily used them to share materials, communicate with parents or design their lessons (OECD, forthcoming[6]). Furthermore, the digital preparedness of teachers varies across schools. On average across OECD countries, students in socio-economically disadvantaged schools were 5.8 percentage points more likely to be taught by teachers without the necessary skills to integrate digital devices in instruction than those in advantaged schools. In Japan, Hungary and Iceland, this gap was as large as 20 percentage points. Statistically significant gaps were also observed in Slovenia (9 percentage points) and Spain (11 percentage points) (Figure 1). These socio-economic disparities in the distribution

of digitally competent teachers risk further widening education inequalities and the digital divide within countries.

Figure 1. Teachers' skills to integrate digital devices in instruction (2022)

Percentage of 15-year-old students whose school leaders reported that teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction.



Note: Advantaged and disadvantaged schools are defined based on their students' average PISA index of economic, social and cultural status (ESCS). Schools in the bottom quarter of their jurisdictions' ESCS distribution are referred to as "socio-economically disadvantaged schools"; and schools in the top quarter are referred to as "socio-economically advantaged schools". Statistically significant differences are marked in a darker tone.
Source: Authors' analysis based on OECD (2023[7]) *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

In many education systems, students perceive larger gaps in their teachers' digital skills than their school leaders do, suggesting that the gaps in teachers' digital skills may be greater than those shown in Figure 1. On average across OECD countries with available data from the 2022 PISA School Questionnaire and the PISA Information and Communication Technology (ICT) Questionnaire, 30.4% of 15-year-old students did not agree that their teachers had the necessary skills to use digital devices during instruction.[1] By contrast, only 11.6% of school leaders in the same countries reported that their teachers lacked the necessary technical and pedagogical skills to integrate digital devices in instruction. There are a range of possible explanations for students' more negative assessment of their teachers' digital competency. Students might have higher expectations for their teachers' digital skills or their direct experience of teachers' classroom practices may enable them to make a more accurate assessment.

3. Strengthening teachers' digital education competency through continuing professional learning

Continuing professional learning can help teachers to prepare for digital education

Teachers can face a range of barriers that limit their take-up and effective use of digital technologies, including a lack of high-quality digital resources, limited incentives or time to integrate them in their practice, as well as insufficient pedagogical and technical training on their use (OECD, 2023[4]). Continuing

professional learning is thus only one of multiple policy levers that need to be considered to help teachers prepare for the digital age.[2] Nevertheless, the importance of teachers' engagement in continuing professional learning (CPL) throughout their careers is widely recognised (Kraft and Papay, 2014[8]) and, given the fast-paced nature of technological change, CPL is particularly important in the area of digital education. As new technologies emerge, CPL can help teachers to keep up with the latest developments, to understand their potential as well as their risks and to develop strategies for their effective use. In addition, advances in learning sciences and a shift towards more personalised and inclusive forms of teaching and learning require teachers to learn how to employ digital resources to pursue these new objectives.

CPL can also help teachers to compensate for gaps in their initial teacher education (ITE). Evidence from a number of OECD countries suggests that many practicing teachers did not acquire sufficient digital skills prior to entering the classroom (Gudmundsdottir and Hatlevik, 2018[9]; Napal Fraile, Peñalva-Vélez and Mendióroz Lacambra, 2018[10]). On average across OECD countries, 43% of teachers in the 2018 Teaching and Learning International Survey (TALIS) reported not having studied the use of ICT as part of their initial teacher education. This proportion is even greater among more experienced teachers (OECD, 2019, pp. 207, Table I.4.13[11]).

Although data on the effectiveness of CPL for digital education remains limited, a meta-analysis of 92 experimental and quasi-experimental studies published between 2000 and 2018 suggests that mathematics and science teachers' use of new digital tools tended to have a stronger positive effect on student performance if it was accompanied by teacher training (Hillmayr et al., 2020[12]). Among countries that participated in the PISA 2022 Teacher Questionnaire, teachers who were recently exposed to professional development on ICT skills also consistently reported using digital resources for a broader range of teaching tasks (OECD, forthcoming[6]).

Many studies that focus directly on teacher's ICT training rely on small sample sizes or self-reports, but the available evidence suggests that CPL activities can at least increase teachers' perceived competency in using digital resources for education. For instance, a pilot of the Deeply Reflective Engagement and Mastery (DREAM) programme in Western Australia, which significantly increased teachers' confidence and competency in using digital resources. The training combined a series of face-to-face learning sessions with regular online support and opportunities for reflection (Sheffield, Blackley and Moro, 2018[13]). A study from Finland found that teachers' training on the use of digital assessment software significantly increased the confidence in using digital resources among teachers with low confidence levels prior to the intervention (Pongsakdi, Kortelainen and Veermans, 2021[14]). Likewise, a quasi-experimental study of a digital competency training programme for elementary school teachers in Indonesia indicated significant improvements in teachers' digital competency and attitude towards digital technologies (Munawaroh, Ali and Hernawan, 2022[15]).

International data collections indicate that the majority of teachers in OECD countries are already engaging in some form of CPL on the use of digital resources. In the TALIS 2018, 60% of lower-secondary teachers across OECD education systems reported having engaged in professional development activities covering ICT skills for teaching over the past 12 months (OECD, 2019, pp. 32, Figure I.1.1[11]). However, the amount of training that teachers engage in is often limited. In European countries, for example, 40% of teachers who had participated in CPL activities for digital education reported having spent less than four days on these activities over the past two years.[3] Furthermore, ICT skills for teaching remained among the top three areas in which teachers reported high training needs in 2018 (OECD, 2019, pp. 165, Figure I.5.6[11]).

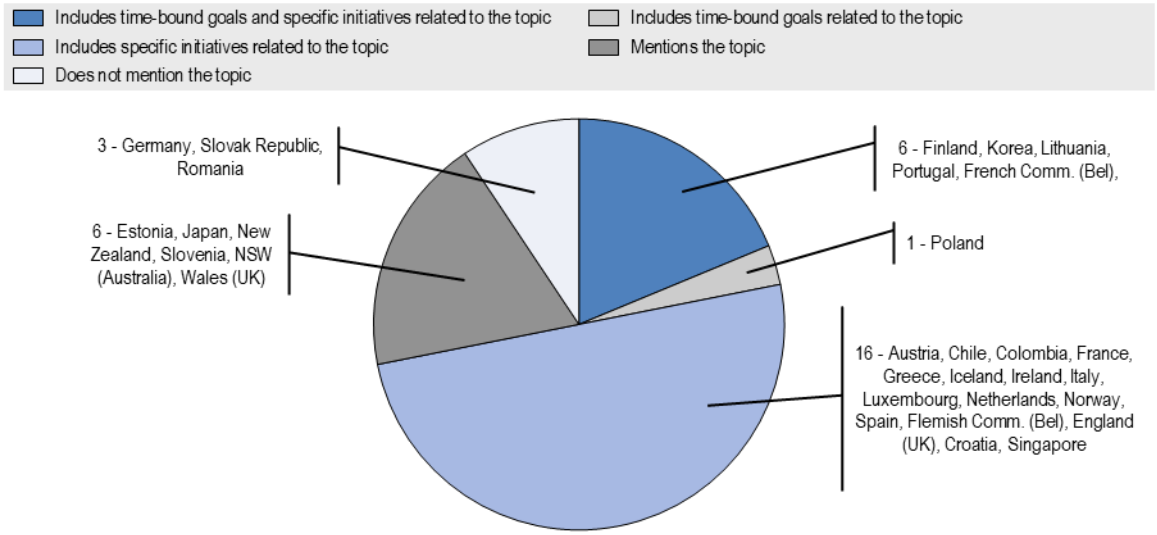
Teachers' preparation for digital education features in nearly all countries' central-level policy strategies

To strengthen teachers' technical and pedagogical skills for digital education, many OECD countries have made teachers' professional learning a strategic priority. Results of the Policy Survey on School Education

in the Digital Age (hereafter "the Policy Survey", see Box 1) show that 29 of 32 participating jurisdictions mention strengthening teachers' digital skills and pedagogies in their central-level strategies guiding digital education policy (Figure 2). Of these systems, 7 include specific time-bound goals related to teachers' capacity building for digital education in their strategic documents and 22 describe specific policy initiatives on the subject (Annex Table B.1). This is in line with previous research highlighting the importance of linking strategic goals to implementation and accountability instruments (van der Vlies, 2020[16]; OECD, 2023[4]).

Figure 2. Central-level strategies to strengthen teachers' digital capacity

Number of jurisdictions whose central-level strategy for digital education addresses teachers' capacity to integrate digital resources in their practice (e.g. reforms of ITE or CPL)



Note: Number of jurisdictions with available data = 32. Responses refer to central-level strategies dedicated to digital education or, if no such strategy exists, broader central-level strategies covering digital education. Countries with missing data or without relevant central-level strategies were excluded. See Annex Table B.1 for further details and individual jurisdictions' responses corresponding to this figure.
Source: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 1.2.

Box 1. The Policy Survey on School Education in the Digital Age

The Policy Survey on School Education in the Digital Age was administered to collect international comparative evidence on digital school education policies. The survey was completed by 37 jurisdictions (26 OECD member countries, 7 sub-national entities and 4 non-member economies).[4] The Policy Survey and its associated outputs were designed to inform the OECD umbrella project *Resourcing School Education: Policies for the Digital Transformation of Education and Future-Readiness of Teachers*. The Policy Survey was administered over the course of 2024 and reflects the policies of participating jurisdictions in January 2025. The Policy Survey covers primary and secondary education (ISCED 1-3). The survey's complete results are presented in Boeskens and Meyer (2025[2]).

Source: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en.

4. Fostering a range of formal and informal professional learning activities for digital education

Effective continuing professional learning should cover a range of learning contents and formats

The effective use of digital technologies in the classroom not only requires teachers to master technical skills, but also the ability to tailor digital resources to subject-specific contents and instructional activities (OECD, 2020[17]). Teachers' CPL for digital education therefore needs to cover a wide spectrum of learning contents. The TPACK framework (Technological Pedagogical Content Knowledge), for example, proposes that teachers' capacity to use digital education resources effectively requires a combination of technological, pedagogical and content knowledge (Mishra and Koehler, 2006[18]).

To allow teachers to develop and broaden these skills and update their knowledge on digital education, policy makers can promote CPL activities in different formats and with different degrees of formality. These can range from highly structured activities, such as traditional seminar-style training courses, to informal practices emerging from the daily activities of teachers, such as informal mentoring arrangement or unstructured professional exchanges and collaborative work (Boeskens, Nusche and Yurita, 2020[19]).

Research evidence suggests that not all forms of CPL are equally effective and supports a shift away from traditional learning formats, which tended to be passive, standardised and one-off. Instead, research highlights the effectiveness of engaging in active, collaborative and individualised forms of CPL over a sustained period of time. This includes school-based programmes that allow teachers to improve their practice by co-operating with other teachers (Opfer, 2016[20]), individualised instructional coaching carried out by trained teacher coaches (Blazar and Kraft, 2015[21]; Kraft and Blazar, 2017[22]), or matching effective teachers with less effective ones (Papay et al., 2016[23]). A systematic review of the empirical literature concluded that CPL with positive effects on student learning typically displays some of the following characteristics (Darling-Hammond, Hyler and Gardner, 2017[24]):

1. It is content-focused.
2. It incorporates active learning utilising adult learning theory.
3. It supports collaboration, typically in job-embedded contexts.
4. It uses models and modelling of effective practice.
5. It provides coaching and expert support.

6. It offers opportunities for feedback and reflection.
7. It is of sustained duration.

Although the evidence remains limited, some studies suggest that these characteristics also matter when it comes to CPL on the use of digital resources for teaching. For instance, a large-scale survey of literacy teachers in the United States highlighted ongoing individual support and a longer duration of training activities as key factors improving teachers' experience with professional development on the use of digital resources (Hutchison, 2012[25]). Policy makers should therefore consider a range of formats beyond traditional seminar-style training when seeking to promote an effective CPL offer.

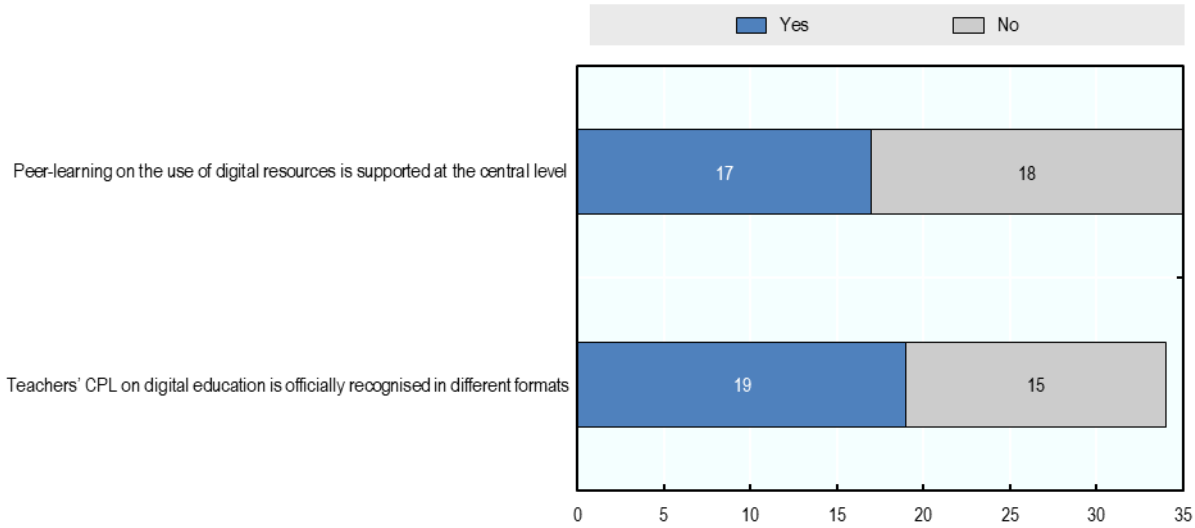
Countries increasingly promote collaborative formats for teachers' continuing professional learning

In many OECD countries, teachers already engage in collaborative and school-based professional learning formats, such as peer-learning activities. In TALIS 2018, 50% of the lower-secondary teachers who participated in ICT training in the previous 12 months reported that they had engaged in peer-learning activities during this period.[5] Some countries are actively supporting teachers' engagement in such collaborative forms of professional learning at the central level. For example, in the Policy Survey, 17 of 35 jurisdictions reported that they provide central support for teachers' engagement in peer learning on the use of digital resources (e.g. mentoring schemes or communities of practice) (Figure 3). This support has taken different shapes across countries and examples – past and ongoing – include the following:

- **Finland** has supported peer-learning activities to strengthen teachers' use of digital technologies and pedagogical innovation early on. Between 2016 and 2018, Finland invested EUR 23 million to build a network of tutor teachers with the goal to reach all 2 500 basic education schools in the country. Tutor teachers were paired with basic education teachers to provide peer support, one-to-one guidance as well as team teaching with a particular focus on the use of digital resources for instruction (Finnish Agency for Education, 2018[26]). An evaluation of the programme highlighted the broad availability of tutor teacher services across schools in the country and a positive self-reported impact on teachers' pedagogical digital skills (Pennanen et al., 2021[27]).
- In 2020/21, **Luxembourg** started recruiting a pool of teachers specialised in digital skills (*enseignant spécialisé en compétences numériques*, I-CN) to support their peers in the use of digital resources and in teaching ICT skills and media literacy. The specialised teachers must hold a master's degree in media didactics and ICT and work with teachers across multiple schools. The I-CNs' work is co-ordinated by the regional directorates for basic education and they are provided with training and a network by the Service for the Co-ordination of Educational and Technological Research and Innovation (*Service de coordination de la recherche et de l'innovation pédagogiques et technologiques*, SCRIPT) (Le ministère de l'Éducation nationale, 2024[28]).
- The **Slovak Republic's** National Centre for the Digital Transformation of Education (NCDTV) was co-founded by the Ministry of Education, Science, Research and Sport to support the implementation of the national project "Digital Transformation of School Education". Among other initiatives, the NCDTV supports networking among school support staff and is organising regional meetings on digital education for teachers, school leaders and ICT co-ordinators to engage in peer learning and collective problem solving (NCDTV, 2023[29]).
- As part of a wider project on the professionalisation of the teaching career (*Profesionalizarea carierei didactice*, PROF), **Romania** is providing teachers with professional mentorship to improve teaching skills, innovate teaching methods and work in learning communities. Between 2021 and 2023, PROF covered training for 28 000 teachers and also served to pilot a new subject curriculum on "digital education and media skills" (European Commission, 2022[30]).

Figure 3. Central initiatives to support independent and collaborative CPL on digital education

CPL Number of jurisdictions that reported providing the following incentives for teachers to engage in CPL



Note: Number of jurisdictions with available data = 34/35. See Annex Table B.2 for further details and individual jurisdictions' responses corresponding to this figure.
Source: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 6.2.

Many countries use digital resources to facilitate teachers' continuing professional learning

Advances in digital technology have also transformed how teachers engage in CPL and provided new opportunities for professional learning. Synchronous and asynchronous online learning activities, such as MOOCs and other forms of online training, have widened access to professional learning and helped to reduce financial, spatial and time constraints (Minea-Pic, 2020[31]). As a consequence an increasing number of teachers in OECD countries is taking part in online and hybrid professional learning formats, particularly since the COVID-19 pandemic. This change in teachers' learning habits has been reflected in official guidelines and regulations. In the Policy Survey, 19 of 34 jurisdictions reported that they officially recognise a range of formats for CPL on the use of digital resources (including e.g. online MOOCs and other micro-credentials) (Figure 3). In many cases, central education authorities also play an important role in the development and dissemination of online learning resources for teachers:

- In **Portugal** the "NAU" online platform provides access to MOOCs largely targeted at teachers and educators (NAU, 2023[32]). The platform is developed and maintained by public national agency Foundation for Science and Technology (FCT). According to a recent evaluation, the General Directorate of Education offers 26 courses on the platform, including courses on the "prevention of online addictions in children and young people" and "cybersecurity in schools" (Gonçalves and Gonçalves, 2023[33]). The platform also offers a MOOC introducing educators to challenges and opportunities related to the emergence of artificial Intelligence in education.
- In **Austria**, the Ministry of Education has developed several MOOCs for teachers that are offered free of charge on the online platform "IMooX" (IMooX, 2022[34]). Some of these courses – such as the Ministry's course on "digital citizenship" – are accredited by teacher training institutions and count towards teachers' continuing or initial teacher education (BMBWF, 2025[35]).

- **Korea's** Education and Research Information Service (KERIS) organised a three-day training programme for primary school teachers in the "Metaverse" in 2022. Using the Metaverse platform, participating teachers were able to watch videos of classroom scenarios and engage directly with their peers (KERIS, 2022[36]).

A systematic review of the literature on digital CPL formats for teachers underlined the potential of digital platforms for teachers to connect with peers and share best practices and resources (Minea-Pic, 2020[31]). Data from the European Union's "2nd Survey of Schools: ICT in Education" show that engagement in digital learning formats was already relatively widespread prior to the COVID-19 pandemic. However, there is significant variation across countries: In Iceland, 69% of teachers reported having used online communities for their professional development within the past two years and 55% of teachers did in the United Kingdom, Romania, Ireland and Lithuania. By contrast, only 12% of teachers in Germany and 20% in Czechia reported having engaged in such online and platform-based CPL activities.[6]

Responses to the Policy Survey also highlight that several countries have introduced central-level policies or initiatives to promote online learning communities for teachers:

- In the **Netherlands**, the Ministry of Education, Culture and Science has commissioned Kennisnet and the Institute for Curriculum Development (SLO) to launch a Digital Literacy Expertise Centre (*expertisepunt digitale geletterdheid*) (EPDG, 2025[37]). The Centre aims to strengthen teachers' capacity for digital education, to create a network and to share examples of good teaching practices involving technology. The Centre publishes a newsletter and serves as a point of contact for teachers to obtain information related to the promotion of students' digital literacy (OCW, 2023[38]).
- Several European education systems encourage teachers to engage in international peer learning and exchange through the **European Commission's** eTwinning initiative. The eTwinning community comprises over one million teachers from across Europe. In addition to learning materials, webinars and online courses, the platform offers opportunities for teachers to connect with peers through video conferences, professional exchanges and work on collaborative projects (European Commission, 2025[39]; European Commission, 2021[40]).

Despite the advantages of digital learning formats, evidence from the literature on adult learning suggests that fully online learning may be less effective than in-person or hybrid formats (Bulman and Fairlie, 2016[41]; Escueta et al., 2017[42]). Experience also shows that engagement in online learning programmes often encroaches on teachers' personal time, which may discourage participation (Minea-Pic, 2020[31]; OCDE, 2024[43]). Digital CPL activities for teachers therefore need to be carefully designed to ensure that online provision does not come at the cost of quality or accessibility.

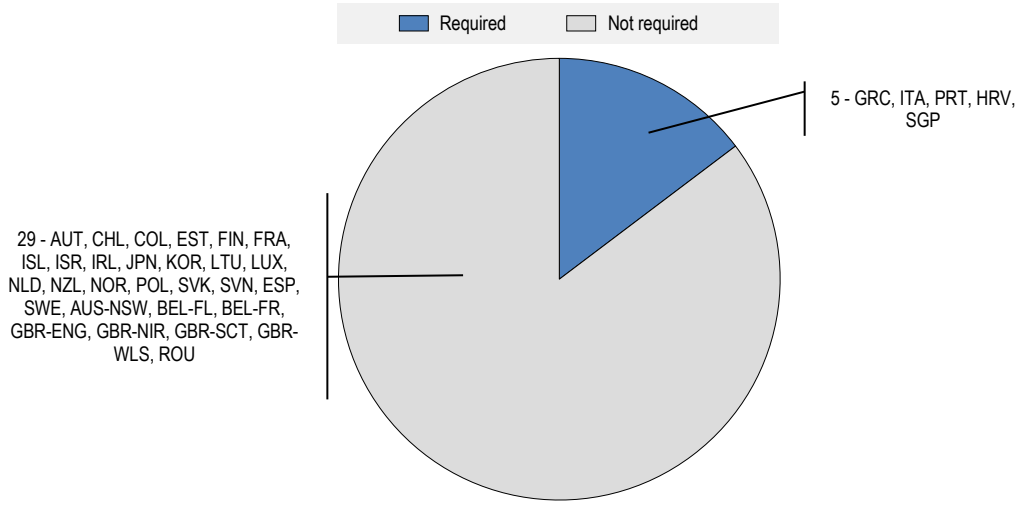
5. Supporting teachers' participation in continuing professional learning on digital education

Few countries require teachers to participate in continuing professional learning on digital education

As of 2021, the majority of OECD education systems had at least some central-level requirements for teachers to engage in professional development, but only 7 of 31 systems with available data mandated the content of teachers' compulsory training (OECD, 2022, p. 391[44]). Typically, teachers and school leaders are autonomous in selecting CPL contents corresponding to their learning needs. This is also borne out in the Policy Survey where only 5 of 27 reporting jurisdictions (Croatia, Greece, Italy, Portugal and Singapore) reported requiring teachers to undertake training on the use of digital resources (Figure 4).

Figure 4. Central requirements to engage in continuing professional learning on digital resources

Number of jurisdictions with central requirements for teachers to undertake in-service training on the use of digital resources for teaching



Note: Number of jurisdictions with available data = 34. See Annex Table B.2 for further details and individual jurisdictions' responses corresponding to this figure.
Source: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 6.2.

Most countries use other mechanisms to encourage and facilitate participation in continuing professional learning on digital education

In the absence of compulsory training on digital education, giving teachers access to attractive learning opportunities and encouraging their participation are key policy levers to ensure teachers' readiness for the digital age. In TALIS 2018, teachers reported that scheduling conflicts, financial costs and a lack of incentives were the most common barriers to their participation in CPL (OECD, 2019, pp. 177, Figure I.5.14[11]) and a 2018 survey of European teachers indicated that the majority of them were learning about ICT in their free time (European Commission, 2019, p. 77[45]).

The Policy Survey shows that more than two thirds of education systems (28 of 35) had taken some steps to address these barriers. For example, 27 of 35 jurisdictions reported offering training on the use of digital resources for teaching free of charge (Figure 5). As discussed above, the provision of free training alone may not be sufficient to encourage teachers' engagement, particularly if the offer is not widely known, easily accessible or corresponding to teacher's needs. Yet, initiatives in several participating countries show how central policies can help to encourage teachers' participation in CPL on digital education in the absence of professional learning requirements:

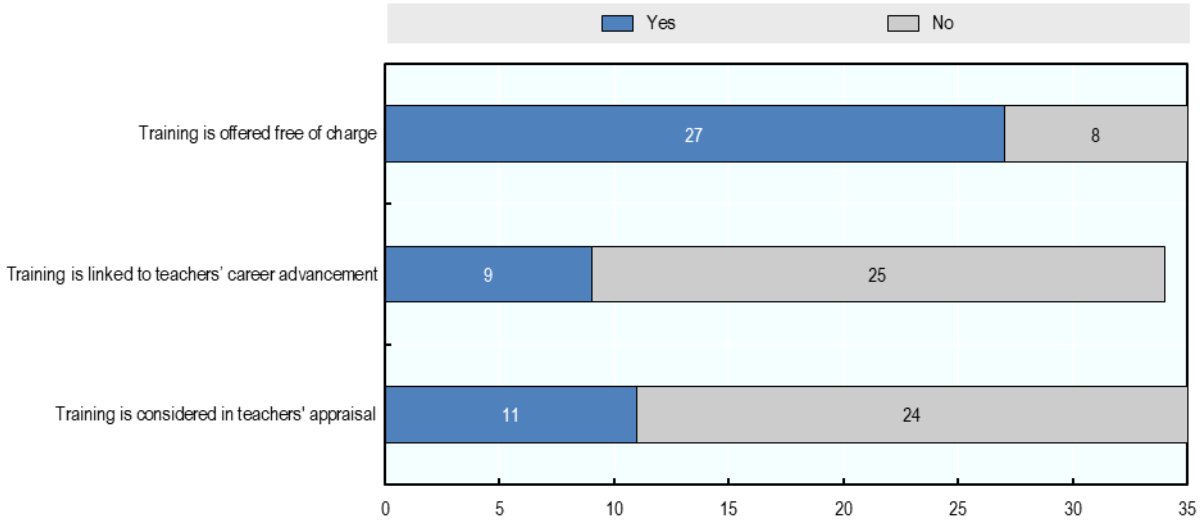
- Teachers in **New Zealand** are not required to engage in professional learning on digital resources. However, since 2016, the Ministry of Education has listed digital fluency as a priority for regionally allocated resources for professional learning and development. This allows schools to apply for funding to organise professional learning opportunities for teachers and school leaders in this area (Ministry of Education, 2023[46]).
- **Ireland** does not mandate teachers' involvement in CPL but primary school teachers who engage in training courses during the summer – including courses on the use of digital resources – are eligible for up to five Extra Personal Vacation (EPV) Days to take during the school year at the

discretion of their Board of Management. Training is provided free of charge by Ireland's teacher training agency *Oide* (Department of Education, 2022[47]).

Some countries also actively encourage professional learning on digital resources by providing teachers with incentives related to their evaluation or career opportunities. 11 of 35 jurisdictions participating in the Policy Survey reported considering teachers' participation in CPL on digital education in their appraisal frameworks and 9 of 34 jurisdictions considered it for teachers' career advancement, although the strength and design of the associated incentives vary (Figure 5).

Figure 5. Support and incentives for teachers to engage in training on the use of digital resources

Number of jurisdictions that have introduced the following measures to support teachers' engagement in training on the use of digital resources



Note: Number of jurisdictions with available data = 34/35. See Annex Table B.2 for further details and individual jurisdictions' responses corresponding to this figure.
Source: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 6.2.

Although training requirements and incentives to engage in CPL may increase the uptake of relevant training, fostering teachers' intrinsic motivation to engage in CPL is widely recognised as an important factor for their sustained and effective participation (Boeskens, Nusche and Yurita, 2020[19]). In TALIS 2018, for example, teachers who reported having joined the profession out of an intrinsic motivation to make a social contribution participated in more CPL activities, controlling for other characteristics (OECD, 2019[11]). Teachers' intrinsic motivation to improve their practice has also been shown to increase innovative behaviour and CPL participation in other contexts (Klaeijsen, Vermeulen and Martens, 2018[48]; McMillan, McConnell and O'Sullivan, 2016[49]). It is thus important to ensure that training requirements and incentives for professional learning do not crowd out teachers' intrinsic motivation. Respecting teachers' autonomy in selecting training offers to match their needs and fostering a culture of learning in schools can help to avoid turning professional learning into a bureaucratic requirement.

However, even for teachers who are motivated to engage in professional learning and provided with the resources and time to do so, the limited availability of relevant training opportunities can pose a challenge. This particularly concerns training on the educational use of new and more advanced digital technologies, such as educational robotics, programming or VR tools, as well as on emerging subjects, such as AI literacy (OECD, forthcoming[50]).

6. Governance and quality assurance of teachers' continuing professional learning

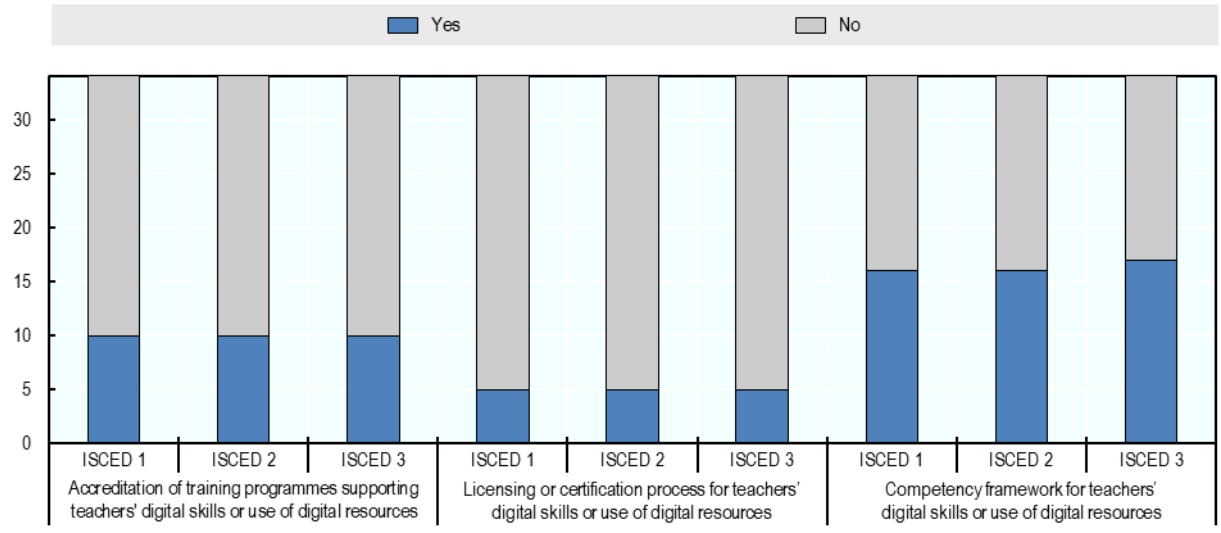
Few countries use certification and accreditation mechanisms to assure the quality of continuing professional learning

In many education systems, the development of professional learning contents is decentralised and the landscape of training providers is highly fragmented. This can make it challenging to monitor the quality of teachers' training on digital education and to ensure that it is aligned with central policy objectives. Although central teacher development institutions play an important role in steering the provision of CPL in some countries, in most OECD education systems, a broad range of actors are involved in the provision of teachers' CPL. In 2021, every OECD education system with available data had more than one provider of CPL activities and in three quarters of education systems, private companies were involved in the delivery of teachers' CPL (OECD, 2022, pp. 402, Table D7.7[44]).

One of the mechanisms that education authorities have at their disposal to ensure the quality of CPL is the accreditation of professional learning programmes or providers. In the Policy Survey, 10 of 35 jurisdictions reported using accreditation mechanisms for training programmes on the use of digital resources for teaching (at ISCED 2) (Figure 6). Other systems may encourage providers to raise the quality of their learning offer by other means or rely on market mechanisms to raise the quality of CPL through competition (Boeskens, Nusche and Yurita, 2020[19]).

Figure 6. Certification and accreditation of teachers' digital skills or use of digital technologies

Number of jurisdictions that reported having the following mechanisms in place at the central level



Note: Number of jurisdictions with available data = 35. See Annex Table B.3 for further details and individual jurisdictions' responses corresponding to this figure.
Source: Reproduced from Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Figure 6.3.

In addition to monitoring the quality of CPL programmes directly, policy makers can focus on their outcomes and develop mechanisms to certify teachers' digital skills and competency in using digital education resources. This can also provide teachers with incentives to engage in relevant CPL and allows

for the recognition of their digital skills in appraisal frameworks or for their career progression. However, only 5 of 35 education systems that participated in the Policy Survey reported having mechanisms in place to certify and license teachers' digital skills or their use of digital resources (Figure 6). Examples include the following:

- In **Greece,** the "B-Level ICT Teacher Training" is a large-scale initiative providing training programmes and certification related to teachers' skills for digital education. The programmes last 36 to 60 hours, including an exam conferring the certification of teachers' digital skills based on two competency levels. The B1 level courses introduce teachers to a range of digital resources and raise awareness around their effective use for teaching. The more advanced B2 level courses provide teachers with a deeper understanding of potential applications of digital resources in their subject area and foster teachers' ability to navigate a range of education software and online environments. The courses include support meetings in which teachers reflect on the practical uses of ICT in the classroom. During the initiative's first phase (2016-20), 30 000 teachers received training at level B1 and 5 000 received training at level B2. The second phrase (2022-26) aims to train 12 600 and 15 000 teachers at levels B1 and B2 respectively (Computer Technology Institute and Press "DIOPHANTUS", 2025[51]).
- In 2022, **Spain** released a new Reference Framework for the Digital Competency of Teachers, which covers teachers' competency in six areas and includes corresponding achievement indicators (Ministry of Education and Vocational Training Spain, 2022[52]). The updated competency framework was intended to provide the basis for certifying the digital competency of 80% of teachers in primary and secondary schools (equivalent to 700 000 educators) by 2024. The autonomous communities were responsible for developing the certification process and supported with EUR 284.7 of central funding by the Ministry of Education and Vocational Training (European Commission, 2022[53]).
- In **France**, the *Pix+ Édu* platform allows teachers and other education professionals to assess and certify their digital skills. *Pix+ Édu* provides teachers with tools to self-assess their digital skills for education and to position themselves on a learning path. The platform provides corresponding online training opportunities for teachers to further develop their skills further and offers them the opportunity to obtain a certification by passing an assessment (OCDE, 2024, p. 49[43]).

Almost half of the countries have digital competency frameworks to guide teachers' continuing professional learning

Even though teachers' engagement in informal or non-traditional CPL may be more difficult to certify, central standards can be an effective instrument to set expectations for the digital skills that teachers should acquire. In the Policy Survey, 16 of 35 jurisdictions reported having a competency framework for teachers' digital skills or the effective use of digital resources for at least some levels of education (Figure 6). Such central frameworks can be used to guide teachers' self-directed learning as well as the development of learning activities by CPL providers. At the European level, the Digital Competence Framework for Educators (DigCompEdu) offers an instrument that countries can use to conceptualise the diverse skills teachers need in increasingly digital education environments (Box 2). In addition, several countries have released their own frameworks for teachers' digital competence, tailored to their national education systems.

Box 2. The European Digital Competence Framework for Educators (DigCompEdu)

The Digital Competence Framework for Educators (DigCompEdu) was developed by the European Commission's Joint Research Centre (JRC) to provide a reference framework describing the skills that educators need to be digitally competent. The framework applies to educators at all levels of education (from early childhood to higher and adult education), including vocational training, special needs education and non-formal learning contexts. The DigCompEdu framework describes 22 competencies organised in six areas: Professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learner's digital competence. Educators can use the accompanying self-reflection tool "SELFIEforTEACHERS" to identify their strengths and skills gaps across the competencies covered by the DigCompEdu framework.

Source: Punie, Y. (ed.) (2017[54]), *European Framework for Digital Competence of Educators: DigCompEdu*, Publications Office of the European Union, Luxembourg.

7. Conclusions

Despite the accelerating digital transformation of school education in recent years, evidence from PISA 2022 points to persistent gaps in teachers' technical and pedagogical ability to use digital resources effectively in the classroom. Continuing professional learning (CPL), if designed effectively, can help to close this gap and equip teachers with the skills they need to seize the opportunities of the digital age. CPL on digital education is therefore an important policy priority and results of the Policy Survey on School Education in the Digital Age show that many education systems have introduced reforms to strengthen teachers' digital competency in recent years.

Empirical evidence suggests that professional learning activities are most effective when they are embedded, content-focused, sustained and collaborative. This insight is increasingly reflected in professional learning policies designed to encourage teachers' engagement in effective CPL formats. Almost half of the jurisdictions participating in the Policy Survey indicate supporting teachers' peer learning on the use of digital resources and recognising new formats for professional learning, such as MOOCs or micro-credentials.

While results of the Policy Survey indicate that few education systems require teachers to participate in CPL on digital resources, countries have introduced a range of measures to incentivise and support teachers' training. This includes the provision of free training courses as well as the recognition of teachers' digital skills or participation in relevant CPL in career progression and appraisal frameworks.

Ensuring the quality and relevance of CPL on digital resources remains a challenge, given its decentralised development and a frequently fragmented landscape of training providers. Results of the Policy Survey indicate that education systems have sought to address this issue using a variety of quality assurance mechanisms. Competency frameworks on teachers' digital skills and the accreditation of training programmes on digital education resources are particularly widespread. By contrast, few countries have undertaken efforts to certify teachers' digital skills directly.

Professional learning will remain indispensable to equip educators with the skills they need to promote effective learning in an increasingly digital world. Emerging technologies, including generative artificial intelligence, call for renewed efforts to provide educators with attractive and effective opportunities to update their technical and pedagogical skills for digital education. By providing an overview of the empirical

evidence, promising practices and the policy landscape surrounding teachers' professional learning on digital resources, this policy paper supports further efforts to strengthen teachers' skills for the digital age.

Notes

[1] Authors' analysis based on OECD (2023[7]) *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

[2] Other policy levers, including teachers' work organisation, professional support and incentive structures will be addressed in a companion policy paper: OECD (forthcoming), "Teacher policies to support the use of digital resources in the classroom", *OECD Education Policy Perspectives*.

[3] Authors' analysis based on data from the teacher questionnaire of the European Union's "2nd Survey of Schools: ICT in Education" (European Commission, 2019[56]), which collected data from educators, school leaders and teachers across 31 countries, including the 28 European Union member states at the time of the survey as well as Türkiye, Norway and Iceland.

[4] The following jurisdictions responded to the Policy Survey on School Education in the Digital Age: Austria, Chile, Colombia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Israel, Ireland, Italy, Japan, Korea, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, New South Wales (NSW) in Australia, the Flemish Community of Belgium, the French Community of Belgium, England (United Kingdom), Northern Ireland (UK), Scotland (UK), Wales (UK), Bulgaria, Croatia, Romania and Singapore. Throughout this document, the terms "jurisdictions" and "systems" are used interchangeably to refer to the respondents to the Policy Survey.

[5] Authors' analysis based on 2018 TALIS data (OECD, 2022[55]). Due to the item design it is not possible to say whether the peer-learning activities teachers engaged in were related to the ICT training.

[6] Authors' analysis based on data from the teacher questionnaire of the "2nd Survey of Schools: ICT in Education" (European Commission, 2019[56]).

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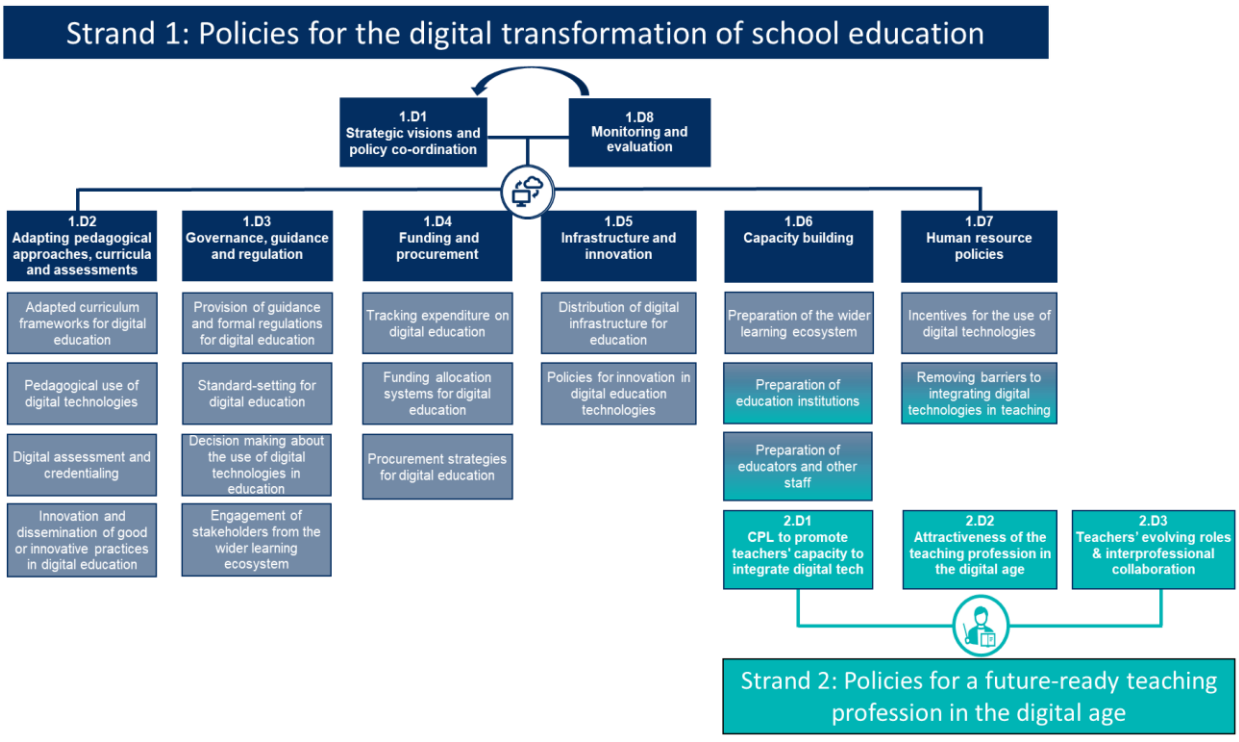
Annex A. Analytical framework of the Resourcing School Education project

The Resourcing School Education project is guided by an analytical framework (see Figure A.1), which covers its Strand 1 (Policies for the Digital Transformation of School Education) and Strand 2 (Policies for a future-ready teaching profession in the digital age). This policy paper addresses topics that are primarily aligned with the Cell "Preparation of educators and other staff" under Dimension 1.D6 ("Capacity building for digital education"), as well as the framework's Dimension 2.D1 ("CPL to promote teachers' capacity to integrate digital technology").

Figure A.1. Analytical framework guiding the Resourcing School Education project



Note: For a more detailed explanation of the project's analytical framework, see OECD (2023, pp. 20, Figure 1.2[4]).
Source: OECD (2025[1]), *Resourcing School Education: Policies for the Digital Transformation of Education and Future-Readiness of Teachers* [website], https://www.oecd.org/en/about/projects/resourcing-school-education.html (accessed on 12 March 2025).

Annex B. Responses to the Policy Survey

This annex includes comparative tables presenting the data from the Policy Survey on School Education in the Digital Age referred to in this policy paper, including the individual responses of all 37 jurisdictions participating in the survey. The tables include detailed information (and contextual footnotes) for all question items covered in the figures and text of this policy paper. For the complete results of the Policy Survey, please refer to Boeskens and Meyer (2025[2]).

The following symbols and abbreviations are used in the tables:

- a = Data are not applicable because the category or question does not apply.
- m = Data are missing because no response was provided.

Where footnotes are included on specific jurisdictions' responses, the cells that they refer to are marked with an asterisk (*).

Annex Table B.1. Central-level strategies for digital education and their thematic coverage

Existence of central-level strategies covering digital education and the thematic areas they address

	Type of strategy		Thematic areas												
	Central-level strategy specifically dedicated to digital education	Broader central-level strategy covering digital education	Use of digital resources in student assessment	Use of digital resources for teaching	Adapting curricula to foster digital skills and/or literacy	Interoperability of digital resources (1)	Standard-setting and quality assurance for digital ed.	Students' well-being and safety in digital environments	Access to fast and reliable Internet for schools (2)	Digital devices and software for schools	The use of artificial intelligence in education (3)	The use of other emerging technologies for education	Stimulating innovation in the EdTech sector	Capacity of teachers to integrate digital resources	Technical support staff for schools
OECD countries															
Austria	✓	✓	A	A/C	A/C	A	A/B/C	A/B/C	A/B/C	A/B/C	*			A/C	A/C
Chile		✓	A	A	A	A/B	A	A/C	A/B/C	A/C	A		A	A/C	A/C
Colombia	✓	✓	A	A/B/C	A	A/B	A	A	A/B	A/B/C	A	A/B	A/C	A/C	A
Denmark		✓	a	a	a	a	a	a	a	a	a	a	a	a	a
Estonia		✓	A	A	A/B	A	A	A	A	A	A	A	A	A	A
Finland	✓	✓	A/B/C	A/B/C	A/B/C	A/B/C	A/B/C	A/B	A	A	A/B/C	A/B	A	A/B/C	
France	✓	✓	A/C	A/C		A/C	A/C	A/C	A/C	A/C	A		A/C	A/C	
Germany	✓		A	A		A		A	A	A	A				A
Greece		✓	A/C	A/C	A/C	A/C		A/C	A	A/B/C	A/C		A/C	A/C	
Iceland		✓		A	A			A/C						A/C	
Israel			a	a	a	a	a	a	a	a	a	a	a	a	a
Ireland	✓	✓	A	A/C	A/B		A	A/B/C	A/B/C	A/C	A	A		A/C	A/C
Italy	✓		A/C	A/B	A/B	A	A/B	A	A/C		A		A/C	A/C	A/C
Japan		✓	A/C	A/C	A/C	A/C	A	A/C	A	A/C	A	A	A	A	A/C
Korea	✓	✓	A/B	A/B/C	A/B/C	A	A/B/C	A/C	A/B/C	A/B/C	A/B/C	A/C	A/B/C	A/B/C	A/B/C
Lithuania	✓	✓	A/B/C	A/B/C	A/B/C	A	A/B/C	A	A/B	A/B/C			A/B	A/B/C	A/B
Luxembourg	✓	✓*	A/C	A/C	A/C			A/C	A	A/C	A/C	A	A	A/C	A/C
Netherlands	✓	✓	A	A	A/C			A/C	A/C	A/C	A	A	A/C	A/C	
New Zealand	✓		A	A/C	A	A	A	A	A	A	A	A	A	A	A
Norway	✓	✓*	A/C	A		A/C		A/C	A	A/C	A/C	A/C	A/C	A/C	A
Poland			A/B/C	A/C	A/B	A/B	A/B	A/B	A/B	A/B	A/B	A/B	A/B	A/B	A/B

	Type of strategy		Thematic areas												
	Central-level strategy specifically dedicated to digital education	Broader central-level strategy covering digital education	Use of digital resources in student assessment	Use of digital resources for teaching	Adapting curricula to foster digital skills and/or literacy	Interoperability of digital resources (1)	Standard-setting and quality assurance for digital ed.	Students' well-being and safety in digital environments	Access to fast and reliable Internet for schools (2)	Digital devices and software for schools	The use of artificial intelligence in education (3)	The use of other emerging technologies for education	Stimulating innovation in the EdTech sector	Capacity of teachers to integrate digital resources	Technical support staff for schools
Portugal	✓	✓	A	A	A			A	A	A				A/B/C	
Slovak Republic	✓	✓			A/C			A/B	A/B	A/B	A/B				A/B
Slovenia	✓	✓	A	A	A/B		A	A	A	A	A/B	A		A	
Spain	✓	✓	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C		A/C	
Sweden		✓	a	a	a	a	a	a	a	a	a	a	a	a	a
Other participants															
NSW (Australia)	✓	✓	A	A	A	A	A	A	A	A	A	A		A	A
Flemish Comm. (Bel)	✓			A/C	A/C	A/C	A/B	A/C	A/C	A/C	A/B	A/C	A/C	A/C	A/C
French Comm. (Bel)	✓			A/B/C	A/B/C				A	A/B/C				A/B/C	
England (UK)		✓	A	A/C	A/C	A/C	A/C	A/C	A/C	A	A/C	A	A/C	A/C	
Northern Ireland (UK)			a	a	a	a	a	a	a	a	a	a	a	a	a
Scotland (UK)			a	a	a	a	a	a	a	a	a	a	a	a	a
Wales (UK)	✓	✓	A	A	A	A	A	A	A	A	A	A	A	A	A
Partners															
Bulgaria		✓	A/B/C	A/B/C	A/C		A/C	A/C	A/B/C	A/B	A		A	A/B/C	
Croatia	✓	✓	A	A/C	A/C	A/B	A/B	A/C	A/C	A/C				A/C	A/B
Romania		✓	A	A	A	A	A	A	A	A	A	A			
Singapore	✓	✓	A/C	A/C	A/C		A/C	A/C	A	A/C	A/C		A	A/C	A/C

Note: Central-level strategies here refer to high-level strategic documents that set out the government's aims with respect to digital education. For the thematic areas, responses refer to jurisdictions' central-level strategies specifically dedicated to digital education or, if no such strategy exists, broader central-level strategies covering digital education. The letters indicate how they are addressed by the central-level strategy: A = Thematic area is mentioned in the strategy; B = Strategy includes specific time-bound goals related to the thematic area; C = Strategy includes specific initiatives related to the thematic area.

(1) Interoperability refers to the ability of computer systems or software to exchange and make use of information from other systems or software; (2) Fast and reliable Internet refers to an Internet connection that meets the criteria of the EU connectivity target for schools of uplink speeds of at least one gigabit per second; (3) AI here refers to a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy.

a = No applicable central-level strategy on digital education.
Austria: The use of AI in education, incl. goals and initiatives, is covered by a separate strategy document ("*Künstliche Intelligenz – Chance für Österreichs Schulen*").
Luxembourg: The action plan "*sécher.digital*" (https://secher.digital/fr) is a broader central-level strategy covering digital education.
Norway: A broader central-level strategy ("*Fremtidens digitale Norge*"), including goals for digital competency, was published in Q4 2024. Information in the tables refers to the education-specific strategy.
Romania: Responses refer to the broader education strategy *România Educată* (Romania Educated), which covers digital education.
Sources: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Tables 1.1 and 1.2; Questions A.1 and A.1.f of the Policy Survey on School Education in the Digital Age.

Annex Table B.2. Teachers' continuing professional learning on digital education resources

Central requirements or incentives for teachers to engage in continuing professional learning (CPL) on the use of digital resources for teaching

	Teachers' participation in CPL on digital education is considered in their appraisal (1)	Training on digital education is linked to teachers' career advancement (2)	Teachers are required to undertake in-service training on digital education	Teachers are offered in-service training on digital education free of charge	Teachers' CPL on digital education is officially recognised in different formats (3)	Central support for peer learning on digital education (4)	Other
OECD countries							
Austria				✓	✓	✓	
Chile				✓		✓	
Colombia							
Denmark	m	m	m	m	m	m	
Estonia				✓		✓	
Finland							
France				✓	✓		
Germany	m	m	m	m	m	m	
Greece	✓	✓	✓	✓	✓		
Iceland				✓	✓	✓	
Israel	✓			✓	✓	✓	
Ireland				✓	✓	✓	
Italy			✓	✓	✓		
Japan				✓	✓	✓	
Korea		✓		✓	✓	✓	
Lithuania	✓	✓		✓	✓		
Luxembourg				✓	✓	✓	
Netherlands							
New Zealand*				✓			
Norway				✓	✓	✓	
Poland							
Portugal	✓	✓	✓	✓	✓		
Slovak Republic				✓		✓	
Slovenia	✓	✓		✓	✓		

	Teachers' participation in CPL on digital education is considered in their appraisal (1)	Training on digital education is linked to teachers' career advancement (2)	Teachers are required to undertake in-service training on digital education	Teachers are offered in-service training on digital education free of charge	Teachers' CPL on digital education is officially recognised in different formats (3)	Central support for peer learning on digital education (4)	Other
Spain	✓	✓		✓	✓	✓	
Sweden	✓	✓		✓			✓
Other participants							
NSW (Australia)				✓			
Flemish Comm. (Bel)				✓		✓	
French Comm. (Bel)				✓		✓	
England (UK)							
Northern Ireland (UK)							
Scotland (UK)	✓						
Wales (UK)					✓	✓	
Partners							
Bulgaria	✓	m	m	✓	m		
Croatia		✓	✓	✓	✓		
Romania	✓	✓		✓	✓	✓	
Singapore	✓		✓	✓	✓	✓	

Note: (1) In this table, "digital education" refers to the use of digital resources for teaching; (2) Includes links to teachers' compensation, career progression, license renewal, etc.; (3) Recognition in a range of formats (incl. e.g. online MOOCs and other micro-credentials), e.g. to satisfy professional development requirements; (4) For example mentoring schemes or communities of practice.
New Zealand: Funding is available for professional development on digital fluency (as one of seven national priorities) if a school/*kura* identifies a need for its setting. Accessing this funding is not mandatory.
Sources: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 6.2; Question F.3 of the Policy Survey on School Education in the Digital Age.

Annex Table B.3. Accreditation and certification of teachers' digital skills

Central-level efforts to measure and/or certify teachers' digital skills or their effective use of digital resources for teaching

	Competency framework for teachers' digital skills or effective use of digital education resources			License or certification process for teachers' digital skills or effective use of digital education resources			Accreditation of training programmes to support teachers' digital skills or effective use of digital education resources			Other		
ISCED level	1	2	3	1	2	3	1	2	3	1	2	3
OECD countries												
Austria	✓	✓	✓									
Chile												
Colombia	✓	✓	✓				✓	✓	✓			
Denmark	m	m	m	m	m	m	m	m	m			
Estonia	✓	✓	✓				✓	✓	✓			
Finland												
France	✓	✓	✓	✓	✓	✓						
Germany	m	m	m	m	m	m	m	m	m			
Greece				✓	✓	✓						
Iceland	✓	✓	✓									
Israel	✓	✓	✓				✓	✓	✓			
Ireland	✓	✓	✓									
Italy										✓	✓	✓
Japan							✓	✓	✓			
Korea	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Lithuania							✓	✓	✓			
Luxembourg	✓	✓	✓				✓	✓	✓	✓	✓	✓
Netherlands												
New Zealand												
Norway	✓	✓	✓									
Poland												
Portugal	✓	✓	✓				✓	✓	✓			
Slovak Republic												

	Competency framework for teachers' digital skills or effective use of digital education resources			License or certification process for teachers' digital skills or effective use of digital education resources			Accreditation of training programmes to support teachers' digital skills or effective use of digital education resources			Other		
ISCED level	1	2	3	1	2	3	1	2	3	1	2	3
Slovenia												
Spain	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Sweden												
Other participants												
NSW (Australia)										✓	✓	✓
Flemish Comm. (Bel)	✓	✓	✓									
French Comm. (Bel)												
England (UK)												
Northern Ireland (UK)												
Scotland (UK)												
Wales (UK)			✓							✓	✓	✓
Partners												
Bulgaria							✓	✓	✓			
Croatia	✓	✓	✓									
Romania	✓	✓	✓	✓	✓	✓						
Singapore	✓	✓	✓									

Sources: Boeskens, L. and K. Meyer (2025[2]), "Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age", *OECD Education Working Papers*, No. 328, https://doi.org/10.1787/464dab4d-en, Annex Table 6.1; Question F.2 of the Policy Survey on School Education in the Digital Age.

Teachers play a critical role in shaping students' education outcomes in increasingly digital learning environments, in exploiting the benefits of education technology and in protecting students from the risks of digital resources. Rather than reproducing traditional teaching practices in a digital format, effective digital education requires teachers to carefully adapt their pedagogical approaches to new learning environments. This policy brief discusses how continuing professional learning (CPL) can prepare teachers for this challenging task. Drawing on insights from PISA 2022 and comparative data collected through the Policy Survey on School Education in the Digital Age, the brief addresses the following questions: Which CPL formats can support teachers' effective use of digital education resources? How can policy makers encourage teachers' professional learning on digital education? And what mechanisms can help to ensure the quality of CPL for digital education?

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