8 Human resource policies for digital education

This chapter considers how human resources policies can be adapted to support the development of high-quality digital education. It highlights some of the ways in which educators' working conditions, career structures and professional support can facilitate or constrain their ability to make effective use of digital education technologies. It also outlines some promising policies that can help educators to make time to engage with digital education, reward their efforts to do so and provide them with appropriate technical and professional support.

Introduction

The digital transformation changes occupations and workplaces, transforming both the types of tasks workers engage in and the way in which they are carried out. Digital work environments require workers to perform a greater variety of tasks (including, for example, managing, communicating and tasks involving reading, writing and numeracy) and to make more intensive use of general cognitive skills (OECD, 2019, p. 39[1]). As digital technologies increasingly permeate education systems, schools and classrooms, they have transformed and will continue to transform how education administrators, school leaders and teachers perform their work.

As discussed in Chapter 7, a lack of capacity among educators can inhibit the progress of digital transformation within education systems. Beyond a lack of capacity, insufficient incentives to use digital technologies in teaching and learning or structural barriers might also jeopardise the integration of digital technologies into teaching. Human resource policies - such as career structures, teacher workload and staffing - are key factors determining educators' ability and motivation to integrate digital technologies in their teaching and learning. Aligning human resource policies with the expectations on educators to improve their digital capacities is thus paramount to realise the potential of digital education.

Acquiring the necessary skills to effectively use digital technologies as well as adapting pedagogical practices to integrate digital technologies require substantive initial time investments, although this investment potentially can pay off in terms of future efficiency gains. Yet, high workloads and the growing range of activities educators need to involve themselves with can leave scarce time to focus on development of digital capacity. Adapting educators' working time arrangements to allow sufficient time for these new tasks and acknowledging educators' time investments in digital education are essential first steps to facilitate successful digital education.

Furthermore, effective incentive structures are needed to motivate educators to adapt their teaching practices to integrate digital technologies. This requires the adaptation of evaluation and career progression frameworks to recognise educators' efforts invested in building digital skills and pedagogies. Such initiatives are particularly crucial in the higher education sector, where there is a long-standing perception that delivering excellent teaching is less rewarding for academics than high achievement in research activities. This perception often limits motivation for innovation of teaching practices.

Effectively integrating digital technologies into teaching can only succeed with the support of appropriately trained technical staff that are available to assist teachers and students with using digital technologies. Education institutions must thus adapt their staffing and compensation models to dedicate resources towards these tasks.

Thus, the digital transformation of education systems is profoundly changing the way educators work. The policies that shape teachers' and educators' working conditions and their use of time have an important role to play in facilitating the take-up and use of digital education technologies. Career structures, professional standards and appraisal systems can provide educators with incentives to use digital technologies, just as working time arrangements can promote educators' collaborative work using digital resources.

This chapter seeks to analyse the types of challenges education systems currently face in motivating and empowering educators to use digital technologies and presents promising approaches observed in OECD and EU countries. In particular, it examines some key questions for policy makers:

- What policies can help educators to overcome time constraints and other barriers that inhibit their effective engagement with digital education technologies?
- What incentive structures are needed to encourage educators' uptake of digital technologies for teaching?

- 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 specialists, IT resource librarians etc.)?

Recent developments and current challenges

As discussed above, digitalisation creates new demands for human resources and expertise in the area of maintenance of digital infrastructure and technical support. The following sections summarise existing evidence about the extent to which human resources policies in OECD education systems are adapted to digital teaching practices and take stock of the key challenges policy makers are facing.

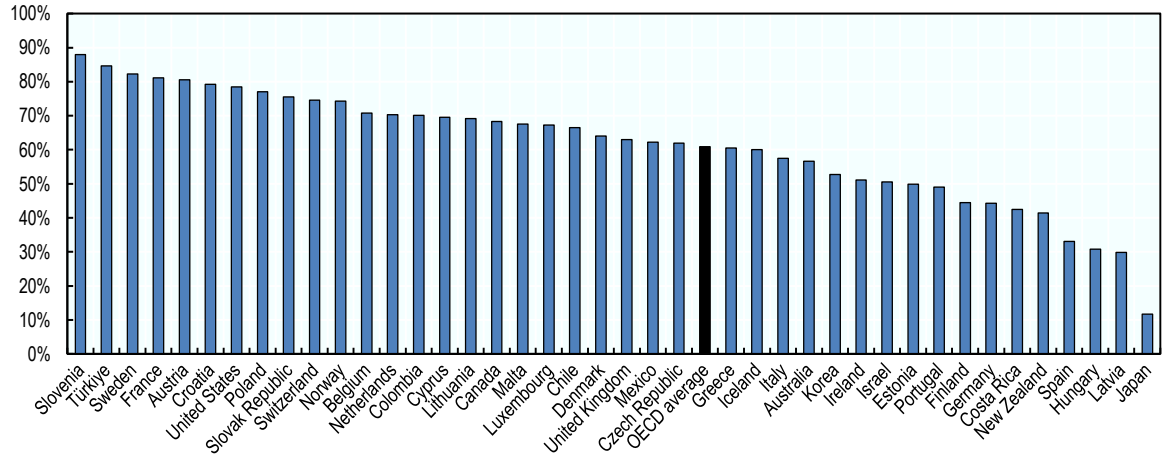
Time constraints often pose barriers to educators' ability to integrate digital technologies in education

The use of digital technologies can help teachers to carry out routine tasks more efficiently but also adds new demands on their time

In schools, the greater use of digital technologies has increased the complexity and diversity of tasks teachers are expected to engage in (OECD, 2019[2]). Even before the pandemic, many teachers reported their workload to be a major source of stress (OECD, 2020[3]). The move towards digital education can place additional demands on teachers' time. For instance, teachers need time to prepare digital education materials, whether to complement in-person lessons, to engage in remote instruction or to deliver materials to students attending hybrid classes from home. Evidence from PISA suggests that, already in 2018, only 61% of 15-year-olds in OECD countries attended a school whose principal considered teachers had sufficient time to prepare lessons integrating digital devices. In Japan, Latvia, Hungary and Spain, fewer than 40% of students were in schools whose principals reported that teachers had sufficient time to prepare lessons with digital education materials Figure 8.1.

Figure 8.1. Teachers' time to prepare digitally enhanced lessons

Percentage of students in schools whose principal agreed or strongly agreed that teachers have sufficient time to prepare lessons integrating digital devices



Source: OECD (2020[4]), *PISA 2018 Results (Volume V): Effective Policies, Successful Schools*, https://doi.org/10.1787/ca768d40-en, Table V.B1.5.15.

On the other hand, digital technologies can also help teachers to make better use of their time by performing more of their responsibilities more efficiently or automating routine tasks. Many teachers already rely on digital tools to save time and enhance the way they engage in administrative tasks, lesson preparation, assessment, professional learning or collaboration (OECD, 2019[2]). Evidence from a survey of over 2 000 teachers in Canada, Singapore, the United Kingdom and the United States conducted prior to the pandemic also suggests that teachers spend between 20% and 40% of their time on activities that could be automated. According to a study, lesson preparation, administration, evaluation and feedback hold particularly significant potential for automation, which could help teachers to spend more of their time focusing on core instructional activities (McKinsey, 2020[5]). Nonetheless, not all tasks with a potential for automation are likely to be carried out autonomously by digital technologies or removed from teachers' control. Most smart technologies are still designed as socio-technical or hybrid systems that complement the work of teachers who retain control and oversight over the process (OECD, 2020[6]).

Similar patterns can be observed in higher education systems in European and OECD countries. Although HEIs began to adopt digital technologies for teaching decades ago, much of the early uptake of digitalisation was driven by individual educators who had expertise in, and enthusiasm for, digitally enhanced delivery (Tømte et al., 2019[7]). On a wider scale, educators in higher education institutions often report a lack of time and resources to develop digital content and pedagogies. For example, recent OECD analysis of digital maturity in Croatia's higher education system highlighted the lack of time that higher education staff have available to integrate digital technologies in teaching, and the lack of extrinsic motivation for them to do so (OECD, 2023[8]).

Higher education workload allocation models may be maladaptive to digitalisation goals, due to the need to balance working time across missions

Higher education institutions face an even more complex situation than schools do with regard to making space for development of staff digital capacity. Higher education institutions have a broader range of missions than schools– typically defined as some balance of teaching, research, and external engagement/service. Most academics work in institutions that balance these three missions, and individual

academics hold appointments that combine responsibility for each. As a result, workload allocation models are often defined at the system, subsector or institution level, to structure the distribution of academic staff time among their responsibilities. Teaching responsibilities of academic staff may be denominated in instructional contact hours per week, student headcount, or courses per semester or year. Regardless of the metric used – courses, hours, or credits – workload models map out responsibilities on a semester or annual basis.

Academic workload models operate on a short-term calendar: over a semester, or year. By common agreement among experts in digital pedagogy, the upfront costs of digital transition or new digital course creation are higher than the time cost of producing or reproducing a traditional in-person course. The cost of transitioning to or implementing digital technologies in higher education teaching are strongly front-loaded, with efficiency gains being potentially realised in the medium to long term. By some estimates, it takes three or more years for the net time costs associated with digital provision to be lower than those of in-person instruction (Gregory and Lodge, 2015[9]). As a result, the time horizons of academic workload models and digital education costs are mismatched, leading to an underinvestment of staff time in transitioning towards a greater use of digital technologies in teaching. An underinvestment of time in the take-up and use of digital technologies means that learners have less access to them than might be desirable, or they are put to use at a lower level of quality.

External incentives and supports to educators to integrate digital tools in their practice appear limited

Career structures and reward systems in schools rarely reflect teachers' efforts to improve their capacity for digital education

The upfront investments educators need to make in order to acquire the necessary skills for digital education and adapt their teaching practices to digital tools call for adequate incentive structures to encourage the integration of digital technologies in education. Human resource policies can provide effective instruments to policy makers to reward innovative uses of digital technologies and acknowledge educators' efforts in the area of digital education.

For instance, well-designed career structures can support an effective deployment of education staff and make the most of their skills in education institutions (OECD, 2019[10]). In 2018, few OECD and EU countries had multi-stage vertical career structures that enable teachers to be promoted based on a succession of formal positions with distinct task profiles and progressive responsibilities (OECD, 2019[10]). Such career pathways may encourage teachers to engage in a wider variety of roles related to digital education in their schools (e.g. as digital co-ordinators, taking leadership positions focused on digital resources management in support of the school leader) and have their time investment and efforts formally recognised.

Evidence from European countries shows that across all levels of school education, the methods most commonly applied by schools to incentivise teachers for the use of ICT in teaching and learning include the provision of additional training hours and ICT equipment for their classroom (European Commission, 2019[11]). However, only one-third of lower secondary students attends schools that offer such incentives to teachers and one-fifth of students in primary education (European Commission, 2019[11]). At the sub-system and system level, little information is available on whether and how improved efficiency in digital resources' use is rewarded and stimulated. In PISA 2018, only about 57% of 15-year-old students across OECD countries attended schools whose principal reported that teachers were provided with incentives to integrate digital devices into their teaching (OECD, 2020[4]).

Low perceived prestige of teaching activities and lack of external support staff limits motivation of higher education teaching staff to develop digital pedagogies

The problem of digital skill development for pedagogy in higher education is compounded because, for many academics, teaching is seen as a lower prestige activity than research, with fewer career rewards: Research-intensive institutions tend to prefer hiring academic staff with established records of achievement in research, and development of teaching skills does not feature highly in promotion and career advancement criteria, or in securing tenure (Blackmore and Kandiko, 2011[12]; OECD, 2020[13]). As a consequence, the incentives for participation in training in teaching are relatively low. In addition, academics with a high focus on research, especially those engaged in contract research, are able to delegate some of their teaching load to teaching assistants (Marini, Locke and Whitchurch, 2019[14]; Finkelstein, 2010[15]; Enders and Musselin, 2008[16]), further reinforcing the message that teaching is subordinate to research.

Educators in teaching-led post-secondary institutions understandably place a priority on their pedagogical responsibilities. However, similar to the situation in schools, they often find that they lack the time and institutional support to adopt digital technologies. For example, in a recent survey of English further education educators only 38% agreed their organisation provides guidance about the digital skills they need, and only 22% agreed they had time to explore new digital tools and approaches (Ghurbhurun, 2020[17]). A systematic meta-review of academic staff perspectives on the use of technology in assessment processes in higher education also noted a lack of integration of technology use for specific purposes (i.e. assessment) within an overall pedagogic framework, a lack of alignment of technological and operational supports for the use of technology, and a lack of a broad available empirical evidence on the efficacy, staff experiences and resources required by the use of technology (Brady, Devitt and Kiersey, 2019[18]).

The terms and conditions of employment in higher education may also be a limiting factor in the take-up of training for digital competence, particularly for higher education educators who are employed on a temporary or part-time basis, who may have few incentives to engage in the development of their capabilities as digitally competent teachers, few opportunities to do so, or may be unaware of professional development opportunities. These part-time, fixed-term educators form an important share of the instructional workforce in many OECD and EU higher education systems (OECD, 2020[13]). Lack of time or access to training and supports is most especially the case for educators teaching in programmes offered at the post-secondary non-tertiary education qualifications or short-cycle tertiary education.

Technical support staff is needed to facilitate the integration of digital technologies in education

Beyond policies that enable and encourage educators to use digital technologies in teaching, education systems also require skilled human resources to roll out and maintain digital infrastructure in education institutions. Currently, education systems across the OECD face significant gaps in the availability of technical assistance at school levels. Across the OECD, only 54% of 15-year-old students attended schools whose principal reported having sufficiently qualified technical assistant staff, ranging from less than 30% in Greece, Ireland and Portugal to more than 70% in Lithuania, Austria, Sweden, the Netherlands and Denmark (and in contrast to more than 90% in countries like Norway and Singapore). On average, this lack of technical assistant staff was more pronounced in disadvantaged schools (OECD, 2020[4]; OECD, 2020[19]).

Higher education institutions, with their wider range of deployed digital technologies across diverse activities and missions, face even greater pressure to attract and retain skilled IT support staff. Higher education institutions tend to maintain a presence of skilled IT staff on site, providing user support, network maintenance, and software, hardware and security updates. The skilled staff needed for these roles are

also generally in demand in a context of wide-ranging digital transformation across the entire economy and may be presented with a wider range of career development opportunities in other sectors. For example, in a recent study of campus IT professionals in the **United States**, 50% reported feeling overworked and being understaffed, while more than 40% reported frequent IT staff turnover, leading to a general trend of less experienced staff being employed on campus (APOGEE, 2022[20]). Similarly, a recent report on the state of digital technology in the further education sector in the **UK** highlighted a growing shortage of ICT staff and a rising ratio of users supported per ICT support staff member (Jisc, 2020[21]).

Promising approaches for adapting human resources frameworks to support digital education development

Review working time and staff arrangements in education institutions to make time and space for digital education

Using digital devices to enhance teaching requires significant time resources. Although the use of digital education technology promises to make some aspects of teachers' work more efficient (see Chapter 1) and online platforms give teachers access to an abundance of learning resources, navigating these resources, preparing digitally enhanced lessons and learning how to do so effectively takes time (Minea-Pic, 2020, p. 23[22]). In PISA 2018, only 60% of 15-year-old students attended a school whose principal reported that teachers had sufficient time to prepare lessons integrating digital devices (OECD, 2020[4]). Even fewer, only 44% of students, attended schools where teachers had a regular scheduled time to share, evaluate or develop instructional materials and approaches that use digital devices (OECD, 2020[19]; OECD, 2020[4]).

While there is "no one-size-fits-all" approach to an effective distribution of teachers' time, policy frameworks that regulate teachers' use of time at the system level can support a more effective use of teachers' time for digital education. Many OECD education systems regulate teachers' time use by focusing primarily on teaching hours (OECD, 2019[10]). However, teachers carry out a significant number of tasks and activities outside of their teaching hours and education systems need to better reflect the time teachers are expected to work on tasks involved by digital education. Digital education amplifies this pattern as teachers need to devote additional time to adapt lesson plans to the introduction of digital tools in their teaching, reconsider and redesign assessment techniques (whether or not relying on digital technologies for assessment) or engage in professional learning for digital education. Implementing workload-based regulation for teachers' working time, adjusting teaching loads (particularly for novice teachers who are not necessarily more self-efficient in integrating digital technologies in their teaching activities) or reducing the teaching time for teachers who take on management activities related to digital education in the school can enable a more effective use of teachers' time.

Beyond policy frameworks at the system level, granting more autonomy to school leaders in the allocation of teachers' time to better account for local needs and strategic priorities can also promote a better and more efficient use of teachers' time. Such measures need to be accompanied, however, by support to school leaders (e.g. guidance, professional learning opportunities) who may lack the capacity or models to build on when redesigning the distribution of teachers' time or may risk undermining teachers' autonomy in their time use (OECD, 2019[2]; Boeskens and Nusche, 2021[23]). Finally, staff arrangements in schools can also enable a more effective use of teachers' and school leaders' time for digital education. While evidence on the effectiveness of hiring additional support staff for easing teachers' administrative burden remains mixed (OECD, 2019[2]; Boeskens and Nusche, 2021[23]), digital education will likely continue to transform the tasks performed by teachers and thereby, their need for support.

In higher education, academic workload policies are sometimes directly set by government, but are often the result of collective bargaining at the sector or institutional level or set by university boards and

management. This means that options for policy steering by Ministerial authorities through the modification of workload models may be limited. Nonetheless, quality assurance bodies and national centres for teaching and learning should prioritise near-term initiatives that give recognition and support to the investment of instructional time in the effective use of digital technologies. Such initiatives could include supporting institutional policies that provide course reductions and summer stipends for course development and supporting augmented professional supports that free up staffing time to focus on the development of digital course materials.

Policies that aim to make time and space for educators to work on digital development may work best when included as part of a more holistic multi-dimensional policy effort. For example:

- In **France**, following the Bertrand report, which provided recommendations for transforming higher education policy in France (Bertrand, 2014), the French government instituted a number of reforms aimed at improving teaching and learning in higher education, including through the use of digitalisation. Notably, the government created a new Directorate General for Higher Education and Professional Integration within the Ministry for National Education, Higher Education and Research, and a new mission unit, the Mission for Pedagogy and Digitalisation in Higher Education (MiPNES), which supports and co-ordinates opportunities for key actors to exchange practices and discuss improvements in teaching and learning. Importantly, these reforms were conducted in conjunction with other regulatory changes to human resources policy. From 2018, for example, new assistant professors with both teaching and research responsibilities are allowed to devote one-sixth of their allocated teaching time for professional learning (OECD, forthcoming).

In the longer run, governments need to focus on both better accounting for teaching costs and piloting new workload models. Governments that have invested in the development of costing models for teaching should work to analyse teaching costs by mode of teaching, and work to account for blended learning environments. Teaching costs should include (but not be limited to) information communication technology infrastructure, redevelopment of content, supporting students, managing assessment on line and other service costs (Tynan, Ryan and Lamont-Mills, 2015[24]). Having a true account of costs can provide a basis for governments, sectoral associations, and institutions to rethink workload models, implementing multi-year instructional workload models that permit those academics who make the upfront investment of time in digital adoption to capture in later years the benefits of their efforts.

Higher education institutions can also reduce the costs of in-person to digital transition or new digital course development that is borne by instructors by providing them with expert professional staff support (course design professionals), or, by providing them with one-off reductions in their course workload. Higher education institutions often appear to limit the time burden associated with digital instruction by capping course sizes. In higher education institutions in the **United States**, online class sizes may be capped at lower levels than the same course taught in person (Xu and Xu, 2019[25]), and in **Ireland** the academic workload model for digital courses proposed by the Teachers' Union of Ireland calls for extra instructional contact hours to be awarded to those teaching courses on line (as compared to in-person instruction), with a two hour online course of 60-80 students counted as equivalent to 12 instructional contact hours per week, potentially an instructor's entire instructional workload for the semester (Consortium, 2020[26]).

Designing incentive mechanisms and career reward structures to encourage teachers' engagement in digital education

In PISA 2018, only 57% of 15-year-old students attended a school whose principal agreed or strongly agreed that teachers are provided with incentives to integrate digital devices in their teaching. Among participating OECD countries, this proportion ranged from 90% or more in Iceland, Lithuania, the Netherlands, Poland, Slovenia and Türkiye, to 20% or less in Spain, Mexico and Korea (OECD, 2020[4]). However, given the effort and upfront investment it can take teachers to enhance their practice with digital education technologies, the right incentive structures must be put in place to encourage teachers to

successfully use digital tools in the classroom. However, incentives must be carefully designed to avoid the risk of crowding out teachers' intrinsic motivation to engage in the pedagogical use of digital technologies and avoid exacerbating existing digital divides within the teaching profession (OECD, 2019[27]; OECD, 2019[10]).

Teachers may benefit from financial rewards, career advancement, reduced teaching hours, competitions that award prizes, additional training hours and additional digital equipment for the classroom (Wastiau et al., 2013[28]). Including digital competencies or practices in professional teaching standards, evaluation and certification frameworks or ITE programmes are additional levers that can incentivise and signal the recognition of teachers' use of digital technologies in the classroom. Some countries have thus designed their reward and promotion structures to reflect educators' engagement with digital education:

- In **Croatia**, sharing innovative teaching methods or creating digital content are listed as evaluation criteria for primary and secondary school teachers, teaching assistants and school principals (Ministry of Science and Education, 2019[29]). Among other aspects, these criteria determine the allocation of annual awards for teaching excellence. They are also used to assess educators' eligibility for career progression (Ministry of Science and Education, 2023[30]).

In addition to using teachers' engagement with digital education to determine vertical career progression, horizontal career development opportunities can create incentives for digital education. Some OECD and non-OECD countries have successfully designed career pathways that offer vertical and horizontal opportunities for professional growth related to digital education:

- In the **Slovak Republic,** teachers can have a career that is both differentiated vertically (beginning teacher, independent teacher, teacher with first certification, teacher with second certification) and horizontally, enabling teachers to take on specialist positions such as the role of a digital co-ordinator, and thereby develop skills and devote themselves more in-depth to this specific area (OECD, 2019[10]).
- **Singapore** (a country widely recognised for digitalisation of its education system) also combines vertical career advancement with horizontal specialisation, enabling teachers to go into a teaching track, a specialist track or a leadership track. Multi-stage career structures also matter for school leadership, particularly in the context of ever-increasing responsibilities of school leaders for the acquisition, management and safe use of digital technologies in their schools.

Recognising skills acquired by teachers as they try to develop innovative teaching practices with digital technologies is critical to encourage teachers' autonomous engagement and continued efforts in such activities. Digitalisation itself can provide new opportunities for recognising teachers' invested time, efforts and acquired skills while integrating digital technologies in their teaching. New methods and tools (e.g. open badges, micro-credentials) have emerged for certifying and recognising a broader variety of skills. For instance, micro-credentials enable teachers to choose a specific skill they wish to develop or have recognised, gather the evidence underpinning their mastery of the skill (e.g. instruction videos) and have it recognised by a reviewer in a credentialing platform (Minea-Pic, 2020[31]).

Providing teachers with the necessary incentives to engage in such skills certification tools also raises the question of how these emerging forms of certification can be recognised as part of official teacher professional development schemes and whether they matter for career progression and compensation. As mentioned in Chapter 7, in the **United States**, a number of states have enabled educators to use micro-credentials to fulfil their continuing education requirements. Other states have experimented with the use of micro-credentials as part of teacher licensure and in some states, micro-credentials have provided pathways for transitioning to more advanced leadership activities (Minea-Pic, 2020[31]; DeMonte, 2017[32]).

Enhance the prestige of teaching in higher education to promote pedagogical innovation

In most higher education systems, moves to mandate training or professional development for higher education educators are likely to fail: academics enjoy autonomy (Watson, 2007[33]), have advanced training in their field of specialisation (Eurydice, 2017[34]) and have a range of duties – research and engagement, in particular – beyond teaching. Therefore, governments and HEI leaders wishing to increase the uptake of training in the use of digitalised delivery need to create opportunities for staff to upskill that are adapted to the incentives they face as professionals, and to the prerogatives of the institutions in which they work.

As noted above, one of the problems faced by some HEIs in trying to implement digitalisation in their teaching programmes is that, for many university academics, teaching is a lower status activity than research (Blackmore and Kandiko, 2011[12]). In some OECD countries, HEIs have sought to improve the standing of higher education teachers and the prestige of the higher education teaching profession by including the quality of teaching as a strategic priority for the institution, assigning explicit responsibility for fostering teacher quality to (for instance) heads of departments, establishing a teaching and learning framework that reflects the values of the institution, and creating annual awards that honour and recognise excellent teaching (Hénard and Roseweare, 2012[35]). Institutional recognition of teaching excellence is now common in European HEIs (Efimenko et al., 2018[36]). A 2017 survey of 78 HEIs across five European countries showed that these awards, designed to motivate educators to improve the quality of their teaching, can encourage innovation in teaching and raise awareness of the importance of improving teaching (Efimenko et al., 2018[36]). Some HEIs have created incentives designed, for example, to increase teacher motivation to engage in pedagogical innovation. For instance, at the University of Edinburgh, in **Scotland (United Kingdom)** and the University of Canterbury, in **New Zealand** academics with a record of excellence in teaching and learning are given additional time to engage in the scholarship of teaching and learning and to share their practice with colleagues (University of Edinburgh, 2017[37]), (University of Canterbury, 2021[38]).

Build sufficient technical and specialist support structures for educators and students using digital technologies for teaching and learning

As education systems increasingly rely on digital tools, human resource policies must be adapted in order to ensure the availability of technical support staff to maintain digital infrastructure in education institutions and assist teachers and students with technical problems as they arise. In school education, many education systems have attempted to meet these needs by appointing digital co-ordinators at a school level:

- According to Eurydice data, about half European countries have created formal positions for teachers tasked with supporting the effective use of digital technologies in schools such as digital co-ordinators in the **Flemish Community of Belgium** (OECD, 2021[39]) and the **Slovak Republic** (Santiago et al., 2016[40]), or e-learning co-ordinators in **Austria** (Nusche et al., 2016[41]). Despite some variation in the nature of these roles between education systems and schools, they tend to entail both pedagogical tasks – such as consulting teachers on the use of digital technologies and organising in-house training – as well as technical tasks – such as the installation and maintenance of IT equipment or installation and configuration of software (European Commission/EACEA/Eurydice, 2019, p. 95[42]).
- Likewise, **Uruguay** accompanied a reform to promote digital inclusion (the *Plan Ceibal*) with the creation of support teacher roles (*Ceibal* teachers) who specialised in advising their peers and helping them to use digital devices effectively for teaching (Santiago et al., 2016[43]).

Currently, most education systems rely on experts within the teaching body to take on responsibilities as digital co-ordinators. However, to ensure that this role is given the attention it deserves, and the responsible

experts have sufficient time resources to support teachers and students in the capacity needed, these roles need to be reflected in compensation and teaching commitments. Some education systems – including **France** and the **Czech Republic** – thus grant additional financial rewards to digital co-ordinators (European Commission/EACEA/Eurydice, 2019[42]).

Higher education institutions are also increasingly recognising the need for specialist professionals who are able to support educators to deploy digital technologies in innovative ways for teaching and learning. For example, the job roles of "digital learning technologist," and "educational technologist" are already well-established in higher education systems in North America and are becoming more prevalent in other regions. This class of staff is often highly qualified and aims to build bridges between technical and pedagogic knowledge, in order to support and advise teaching academics on the effective development of online and digitalised learning material (OECD, 2023[8]).

Key messages

Whilst digital technologies provide opportunities to enhance quality and efficiency of education delivery in the medium and long run, integrating digital tools into teaching practices initially requires significant time investments. Currently, educators across OECD and EU countries are given little time and incentives to enhance their pedagogies through the use of digital technologies. This problem is particularly acute at higher education levels, where teaching– and thus time invested in pedagogical innovation – suffers from a low standing relative to research activities. Human resource policies can be adjusted to help educators make time to engage with digital education and reward their efforts to do so. This chapter presents a range of such policies, including reviewing working time arrangements and considering teachers' engagement with digital pedagogies in evaluations and promotion decisions.

In addition, the analysis in this chapter highlights the importance of providing educators with the necessary technical support to navigate increasingly digital education settings. Currently, education systems across the OECD and EU record a severe lack in technical support staff. In this light, this chapter considers human resource policies to provide specialist support to educators for effective digital education.

References

APOGEE (2022), *Overcoming campus IT staffing nd expertise gaps*, https://www.apogee.us/wp-content/uploads/2022/09/E-book_Overcoming-Campus-IT-Staffing-and-Expertise-Gaps_FINAL_092022.pdf. [20]

Blackmore, P. and C. Kandiko (2011), "Motivation in academic life: a prestige economy", *Research in Post-Compulsory Education*, Vol. 16, pp. 399-411, https://doi.org/10.1080/13596748.2011.626971. [12]

Boeskens, L. and D. Nusche (2021), "Not enough hours in the day: Policies that shape teachers' use of time"*, OECD Education Working Papers No. 245*, https://www.oecd-ilibrary.org/docserver/15990b42-en.pdf?expires=1612870680&id=id&accname=guest&checksum=0EE68B29EDB55C08FF4E0B79834AA3B5 (accessed on 9 February 2021). [23]

Brady, M., A. Devitt and R. Kiersey (2019), "Academic staff perspectives on technology for assessment (TfA) in higher education: A systematic literature review", *British Journal of Educational Technology*, Vol. 50/6, pp. 3080-3098, https://doi.org/10.1111/BJET.12742. [18]

Consortium, A. (2020), "MOU Position Paper One: Online Delivery". [26]

DeMonte, J. (2017), *Micro-credentials for Teachers: What Three Early Adopter States Have Learned So Far*, American Institute for Research, https://openbadges.org/about/. (accessed on 12 October 2020). [32]

Efimenko, E. et al. (2018), *Enhancement and recognition of teaching and learning in higher education: The impact of teaching and excellence prizes*, https://eua.eu/downloads/content/2018_j02_t7_efimenko%20et%20al_onlineversion_journal.pdf (accessed on 11 May 22). [36]

Enders, J. and C. Musselin (2008), "Back to the Future? The Academic Professions in the 21st Century", in *Higher Education to 2030, Volume 1, Demography*, OECD Publishing, Paris, https://doi.org/10.1787/9789264040663-5-en. [16]

European Commission (2019), *2nd Survey of Schools: ICT in Education - Objective 1: Benchmark progress in ICT in schools*, Luxembourg: Publications Office of the European Union, https://doi.org/10.2759/23401. [11]

European Commission/EACEA/Eurydice (2019), *Digital Education at School in Europe*, Publications Office of the European Union, Luxembourg, https://doi.org/10.2797/763. [42]

Eurydice (2017), *Modernisation of higher education in Europe: academic staff*, Publications Office of the European Union, https://ec.europa.eu/info/sites/default/files/209_academic_staff_2017.pdf (accessed on 24 May 2022). [34]

Finkelstein, M. (2010), "Diversification in the academic workforce: The case of the US and implications for Europe", *European Review*, Vol. 18/1, pp. 141-156, https://doi.org/10.1017/S1062798709990366. [15]

Ghurbhurun, R. (2020), *If we don't upskill teachers in digital skills, learners will suffer*, https://www.jisc.ac.uk/blog/if-we-dont-upskill-teachers-in-digital-skills-learners-will-suffer-30-nov-2020 (accessed on Accessed 27 May 2022). [17]

Gregory, M. and J. Lodge (2015), "Academic workload: the silent barrier to the implementation of technology-enhanced learning strategies in higher education", *Distance Education*, Vol. 36/2, pp. 210-230, https://doi.org/10.1080/01587919.2015.1055056. [9]

Hénard, F. and D. Roseweare (2012), *Fostering quality teaching in higher education: Policies and practices*, OECD Publishing, https://www.oecd.org/education/imhe/QT%20policies%20and%20practices.pdf. [35]

Jisc (2020), *IT infrastructure reviews: key findings | Jisc*, https://www.jisc.ac.uk/reports/it-infrastructure-reviews-key-findings (accessed on 6 July 2022). [21]

Marini, G., W. Locke and C. Whitchurch (2019), *The future higher education workforce in locally and globally engaged higher education institutions: a review of literature on the topic of the academic workforce*, Centre for Global Higher Education, UCL Institute of Education, https://discovery.ucl.ac.uk/id/eprint/10121427/1/wp43.pdf (accessed on Accessed 24 May 2022). [14]

McKinsey (2020), *Artificial intelligence in education: How will it impact K-12 teachers*, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/how-artificial-intelligence-will-impact-k-12-teachers (accessed on 18 August 2020). [5]

Minea-Pic, A. (2020), "Innovating teachers' professional learning through digital technologies", *OECD Education Working Papers*, No. 237, OECD Publishing, Paris, https://doi.org/10.1787/3329fae9-en. [22]

Minea-Pic, A. (2020), *Innovating teachers' professional learning through digital technologies*, OECD Publishing, Paris, https://doi.org/10.1787/3329fae9-en (accessed on 24 February 2021). [31]

Ministry of Science and Education (2023), *Rules on the advancement of teachers, professional associates and principals in primary and secondary schools and colleges*, https://www.zakon.hr/cms.htm?id=44746 (accessed on 13 April 2023). [30]

Ministry of Science and Education (2019), *Rulebook on rewarding teachers, teachers, professional associates and principals in primary and secondary schools and student dormitories*, https://narodne-novine.nn.hr/clanci/sluzbeni/2019_05_53_1019.html (accessed on 13 April 2023). [29]

Nusche, D. et al. (2016), *OECD Reviews of School Resources: Austria 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, https://doi.org/10.1787/9789264256729-en. [41]

OECD (2023), *Advancing Digital Maturity in Croatia's Higher Education System*, OECD Publishing, Paris, https://doi.org/10.1787/26169177. [8]

OECD (2021), "Teachers' professional learning study: Diagnostic report for the Flemish Community of Belgium", *OECD Education Policy Perspectives*, No. 31, OECD Publishing, Paris, https://doi.org/10.1787/7a6d6736-en. [39]

OECD (2020), "Learning remotely when schools close: How well are students and schools prepared? Insights from PISA", *OECD Policy Responses to Coronavirus (COVID-19)*, OECD Publishing, Paris, https://doi.org/10.1787/3bfda1f7-en. [19]

OECD (2020), *PISA 2018 Results (Volume V): Effective Policies, Successful Schools*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/ca768d40-en. [4]

OECD (2020), *Resourcing Higher Education: Challenges, Choices and Consequences*, OECD Publishing, https://doi.org/10.1787/735e1f44-en. [13]

OECD (2020), *Smart Data and Digital Technology in Education: AI, learning Analytics, and beyond*, https://www.oecd.org/fr/education/ceri/smart-data-digital-technology-education-learning-analytics-ai.htm. [6]

OECD (2020), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/19cf08df-en. [3]

OECD (2019), *OECD Skills Outlook 2019: Thriving in a Digital World*, OECD Publishing, Paris, https://doi.org/10.1787/df80bc12-en. [1]

OECD (2019), *PISA 2021 ICT Framework*, https://www.oecd.org/pisa/sitedocument/PISA-2021-ICT-Framework.pdf (accessed on 8 April 2022). [27]

OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en. [2]

OECD (2019), *Working and Learning Together: Rethinking Human Resource Policies for Schools*, OECD Reviews of School Resources, OECD Publishing, Paris, https://doi.org/10.1787/b7aaf050-en. [10]

Santiago, P. et al. (2016), *OECD Reviews of School Resources: Uruguay 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, https://doi.org/10.1787/9789264265530-en. [43]

Santiago, P. et al. (2016), *OECD Reviews of School Resources: Slovak Republic 2015*, OECD Reviews of School Resources, OECD Publishing, Paris, https://doi.org/10.1787/9789264247567-en. [40]

Tømte, C. et al. (2019), "Digitalisation in higher education: mapping institutional approaches for teaching and learning", *Quality in Higher Education*, Vol. 25/1, https://doi.org/10.1080/13538322.2019.1603611. [7]

Tynan, B., Y. Ryan and A. Lamont-Mills (2015), "Examining workload models in online and blended teaching", *British Journal of Educational Technology*, Vol. 46/1, pp. 5-15, https://doi.org/10.1111/BJET.12111. [24]

University of Canterbury (2021), *Teaching Development Scholarships*, https://www.canterbury.ac.nz/about/ako/future-learning-and-development/academic-development/teaching-development-scholarship/ (accessed on 1 May 2021). [38]

University of Edinburgh (2017), *What is Scholarship of Teaching & Learning (SoTL)?*, https://www.ed.ac.uk/institute-academic-development/learning-teaching/staff/sotl/what-is-sotl (accessed on 1 May 2021). [37]

Wastiau, P. et al. (2013), “The use of ICT in education: A survey of schools in Europe”, *European Journal of Education*, Vol. 48/1, pp. 11-27, https://doi.org/10.1111/EJED.12020. [28]

Watson, D. (2007), *The university and its communities*, https://www.oecd.org/site/imhe2006bis/37477605.pdf. [33]

Xu, D. and Y. Xu (2019), “The Promises and Limits of Online Higher Education UNDERSTANDING HOW DISTANCE EDUCATION AFFECTS ACCESS, COST, AND QUALITY”. [25]