A Flying Start

IMPROVING INITIAL TEACHER PREPARATION SYSTEMS

OECD

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Foreword

We demand a lot from our teachers. We expect them to have a deep and broad understanding of what they teach and whom they teach, because what teachers know and care about makes such a difference to student learning. That entails professional knowledge (e.g. knowledge about a discipline, knowledge about the curriculum of that discipline, and knowledge about how students learn in that discipline), and knowledge about professional practice so they can create the kind of learning environment that leads to good learning outcomes. It also involves enquiry and research skills that allow them to be lifelong learners and grow in their profession. Students are unlikely to become lifelong learners if they don't see their teachers as lifelong learners.

But we expect much more from our teachers than what appears in their job description. We also expect them to be passionate, compassionate and thoughtful; to encourage students' engagement and responsibility; to respond to students from different backgrounds with different needs, and to promote tolerance and social cohesion; to provide continual assessments of students and feedback; to ensure that students feel valued and included; and to encourage collaborative learning. And we expect teachers themselves to collaborate and work in teams, and with other schools and parents, to set common goals, and plan and monitor the attainment of those goals.

There are aspects that make the job of teachers much more challenging and different from that of other professionals. Teachers need to be experts at multitasking as they respond to many different learner needs all at the same time. They also do their job in a classroom dynamic that is always unpredictable and that leaves teachers no second to think about how to react. Whatever a teacher does, even with just a single student, will be witnessed by all classmates and can frame the way in which the teacher is perceived in the school from that day forward.

But how to educate people to live up to these demands? In 2016-18 the OECD carried out an initial teacher preparation (ITP) study in Australia, Japan, Korea, the Netherlands, Norway, the United States and Wales (United Kingdom). It aimed to identify and explore common challenges, strengths and innovations in ITP, and set out future directions to support countries in improving their ITP systems. Its findings are compiled in the TeacherReady! platform – an infographic-style website that contains all the resources collected and produced in the study in a structured, easily accessible and searchable form for various stakeholders (policy makers, teacher educators, teachers, ITP leaders) and country contexts.

Flying Start – Improving Initial Teacher Preparation Systems is the companion of the TeacherReady! platform more targeted to policy makers and researchers. This report discusses the relevance of studying ITP and explores concepts and features of ITP systems that are key for policy design. It lays out some common challenges related to ITP policies identified in the course of the study as well as the underlying evidence and data, and brings together examples and promising strategies from diverse parts of the world

that have the potential to address these challenges at each level of the system. Lastly, it brings together these findings and draws conclusions with regard to the effective governance of ITP as well as future directions for policy and research.

In doing so, Flying Start – Improving Initial Teacher Preparation Systems and the TeacherReady! platform seek to foster a dialogue among the various ITP stakeholders on how to enhance each building block of the ITP ecosystem as well as interconnections between different parts of the system to improve its coherence and the learning experience of future generations of teachers to equip them for the demands of contemporary teaching.

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Executive Summary

In order for teachers to deliver high-quality instruction and help all students reach their full potential, countries need to establish and sustain a coherent system of initial teacher preparation that can serve as the foundations for a process of continued development throughout the full duration of a teacher's career.

Although evidence on effective teacher education is growing, it is far from being clear-cut and conclusive, which makes it challenging for governments to make evidence-informed decisions about policy reform in this field. Drawing upon resources produced by the OECD Initial Teacher Preparation (ITP) study, this report aims to support stakeholders in designing and sustaining initial teacher preparation systems.

The ITP study consisted of policy reviews in seven countries: Australia, Japan, Korea, the Netherlands, Norway, the United States and Wales (United Kingdom). The report describes some key challenges identified by the reviews and proposes strategies for different levels of the system – policy, teacher education institutions and schools – based on both international evidence and practices identified in the study. Below are key messages of the report's six chapters:

The initial teacher preparation system

Initial teacher preparation is the first step in the continuum of teacher learning and should be understood as a system of multiple actors and artefacts.

Initial teacher preparation should mark the beginning, not the end, of the process of professional development. This means looking at teacher education as one continuous process, starting with attracting and selecting candidates, equipping them with the necessary competences through quality training, certification and registration, and then supporting their early development in schools. Initial teacher preparation should be seen as a complex system that evolves according to the interactions of the various stakeholders (e.g. policy makers, teacher educators, teachers, candidates) and material artefacts involved (e.g. accreditation criteria, professional standards).

The role of evidence in designing ITP systems

Supporting the production, dissemination and utilisation of knowledge about ITP policies and practices is fundamental for creating an evidence-informed ITP system.

Despite a growing need for robust evidence on teacher preparation, there are to-date few large-scale research studies, and little research on policy implementation in ITP. A coherent research strategy is a key component for the effective production, dissemination and utilisation of knowledge on ITP. Supporting the collection and use of ITP programme data across the system is part of such a strategy. Accreditation and quality assurance

mechanisms can contribute to cultivating evidence-informed and self-improving ITP systems, as long as they encourage processes that lead to continuous improvement, instead of focusing only on outcome measures and achieving minimum benchmarks.

A balanced teacher workforce

Establishing a high-quality teaching workforce involves using diversified ITP data to forecast workforce needs, as well as raising the status of teaching and teacher education.

The link between ITP and a balanced teacher supply and demand makes it necessary to use diversified longitudinal ITP data for workforce forecasting. A robust methodological approach and the involvement of every level of the ITP system – i.e. national, regional, teacher education institutions, and schools – is needed for a strategic and comprehensive collection and analysis of data. While diversified ITP pathways, such as alternative routes into teaching, can temporarily resolve supply-demand issues, they also carry the risk of diminishing the value of teacher education, and can work against sustainable solutions. For a high-quality teaching workforce, entry, selection, certification and hiring criteria need to take into account the multiple dimensions of professional competence, including motivational and affective competences such as professional responsibility and career values.

Equipping teachers with updated knowledge and competences

Ensuring a comprehensive, coherent, relevant and continuously updated initial teacher education requires engaging in collective reflections on teachers' knowledge.

A coherent and comprehensive initial teacher education curriculum covers both content and pedagogical knowledge, and develops practical skills linked to theoretical knowledge. Ensuring that emerging evidence and new models of teaching and learning are regularly integrated in initial teacher education requires a continuous collective reflection on teachers' knowledge. Strong partnerships between schools and teacher education institutions can facilitate this reflection and support the alignment of teacher education content and the school context. Since they both play a central role in developing teachers, university- and school-based teacher educators should be provided with opportunities to extend their knowledge and participate in communities of collaborative enquiry.

An integrated early professional development for new teachers

Early professional development involves research-based reflections on teaching and learning, and should be embedded in a continuous professional learning culture.

In addition to opportunities to refine teaching skills, beginning teachers also need to engage in creative processes of reflection and evaluation of teaching and learning models. Critical reflections should draw on research evidence and student data in order for teacher learning to be 'grounded in practice'. Mentoring programmes can be drivers of quality induction if they build on good practices. However, evidence on effective mentoring, and how to build the capacity of experienced teachers to become mentors is not yet robust

enough. When induction and support programmes are integrated in a professional learning culture, schools are able to engage new teachers in innovation and continuous school improvement.

Towards a coherent, evidence-informed, sustainable and self-improving ITP system

Effectively governing an ITP system requires a shared vision of teacher learning as a continuum, strategic governance of knowledge around ITP, and capacity building at all levels.

Placing the idea that teacher learning is a continuum at the centre of a shared vision for ITP can help systems focus on ensuring a sustainable teaching workforce while also improving its quality. It can serve as the basis for designing coherent learning experiences for all teachers through equally coherent policies. Strategic knowledge governance involves identifying evidence gaps, coordinating and systematising existing evidence, and building new evidence. Collective ownership and the co-construction of evidence by different actors – teacher candidates, teachers and researchers – can strengthen the evidence base at the system level. This requires capacity at the individual, organisational and system levels. A coherent ITP system needs to establish cross-institutional and multilevel partnerships to engage stakeholders who belong to different contexts in a whole-of-system perspective.

Chapter 1. The role of initial teacher preparation

This chapter describes the background of the OECD Initial Teacher Preparation Study, discusses its methodology and presents its outputs. It introduces the Teacher Education Pathway Model that served as an organising framework to the Study. Further, the chapter explores the concept of initial teacher preparation both as part of the continuum of teachers' professional learning and as a complex system encompassing a variety of stakeholders and artefacts. Finally, it lays out the key challenges of initial teacher preparation systems as they relate to the Pathway Model.

1.1. Introduction

Improving the quality of the teaching workforce has been a key policy objective in many countries in an effort to effectively develop students' competences and help them reach their potential (OECD, 2015[1]). A variety of policy strategies and initiatives can be linked to this objective such as introducing accountability measures (teacher evaluation, teaching standards), making the profession more attractive (increasing salaries, introducing career stages), and perhaps most importantly, improving initial teacher education and professional development (OECD, 2015[1]; 2013[2]). Exploring the quality features of teacher education systems is thus crucial in supporting countries to achieve this objective.

Research investigating the impact of structural features of teacher education on teaching quality, has shown that certification, the type of qualification, degrees earned or years of experience matter for student learning (Darling-Hammond, 2000[3]; Hanushek, Kain and Rivkin, 1998[4]). Studies have also demonstrated the importance of substantive features such as course content, linking theory to practice, opportunities for reflection on teaching and learning, an emphasis on the clinical aspects of practice, and so on (Darling-Hammond, 2006[5]; Grossman, Hammerness and McDonald, 2009[6]). Research has also identified indicators applicable to different kinds of programmes, such as a clear and shared vision of good teaching; alignment of opportunities to learn both theory and practice with the vision, and opportunities to "enact" (i.e. practice) teaching (Hammerness and Klette, 2015[7]). While the body of research investigating the different features of teacher education has been growing, evidence is far from being clear and conclusive on what quality teacher education is like (Hammerness and Klette, 2015[7]; Low et al., 2012[8]). This makes it challenging for governments to make evidence-informed decisions about policy reform in this field (Low et al., 2012[8]).

This report aims to support educational stakeholders in critically considering some key features of teacher preparation systems. It intends to do so by analysing the resources produced in the OECD initial teacher preparation (ITP) study. This study was brought to life to provide countries with feedback on their ITP systems by identifying and exploring common challenges, strengths and innovations. Seven countries took part: Australia, Japan, Korea, the Netherlands, Norway, the United States and Wales (United Kingdom).

The report complements the main output of the ITP study, the Teacher Ready! Platform, www.oecdteacherready.org. This interactive platform contains all the resources collected and produced in the study in a structured, searchable and easily accessible form for use by various stakeholders (policy makers, teacher educators, teachers, ITP leaders) and in diverse country contexts. Using the platform as a reference to the specific resources, this report aims to provide a cross-national and cross-thematic synthesis of these insights.

The study applied a SWOT (Strengths, Weaknesses, Opportunities, Threats) policy diagnosis approach based on a conceptual framework, the Teacher Education Pathway model (see section 1.2). The SWOT diagnosis of each ITP system was established following an extensive review visit during which a group of experts conducted semi-structured interviews with a selection of all relevant stakeholders (national, regional, local authorities, schools, initial teacher education providers, professional associations, teacher unions, school boards, accreditation agencies, etc.). The diagnosis was based on desk research (e.g. studies, country reports, national data), interview notes and a validation process of initial findings with the ministry of each participating system (see Annex A. for details on the review methodology).

A second output of the study is the OECD ITP final conference that provided the opportunity to conduct a series of workshops and feedback sessions with a number of experts and stakeholders. These sessions brought together experts from the OECD review teams and stakeholders from the participating countries, including teachers, teacher educators, researchers, national and sub-national policy makers and others, as well as a few participants from other countries. The workshops were designed to:

- share and discuss findings from all OECD ITP reviews
- agree on the most common challenges in ITP systems in participating countries
- identify approaches and strategies to address these challenges drawing on examples of "promising practices" identified by the expert teams
- envision and identify principles of effective ITP systems.

This report – the third output – aims to provide educational stakeholders with a deeper analysis of the resources produced and collected as part of the reviews: background reports participating countries prepared prior to the review visits, the policy diagnosis established as a result of each of the reviews, examples for teaching pathways and policy practices in many areas of ITP, as well as a series of expert workshops conducted during the study and as part of the final conference.

In particular, the report explores:

- concepts and features of ITP systems that are key for policy design
- common challenges related to the design and implementation of ITP policies
- possible strategies to address these challenges at different levels of the system (national, institutional, school, etc.).

It is important to note that the analysis presented in this report does not aim at providing a comprehensive nor systematic approach to the topics discussed in each challenge, or in the policy strategies proposed to address these. Rather, it builds on the seven policy reviews to provide educational stakeholders with relevant snapshots of each context and identify key areas for policy action. Although these common challenges and policy recommendations aim at supporting the design and sustaining of effective and high-quality teacher preparation systems globally, the analysis is still limited to this set of contexts and some findings may not be entirely generalisable and thus applicable to any context.

The report is organised as follows:

- The first chapter situates the discussion in the wider educational context. It discusses the relevance of investigating the quality of ITP systems, key definitions and conceptualisations of ITP and gives some perspectives on its key challenges.
- The second to fifth chapters lay out the four key challenges that have emerged from the ITP reviews, workshops and final conference, describing the underlying evidence and data. These chapters also highlight a number of policy strategies and practices that were identified in the study and that have the potential to address these challenges. For easier reference, the practices are listed at the end of each chapter in a table with hyperlinks to the Teacher Ready! platform for further information.
- The last chapter draws conclusions with regards to the effective governance of ITP and offers future directions for policy and research.

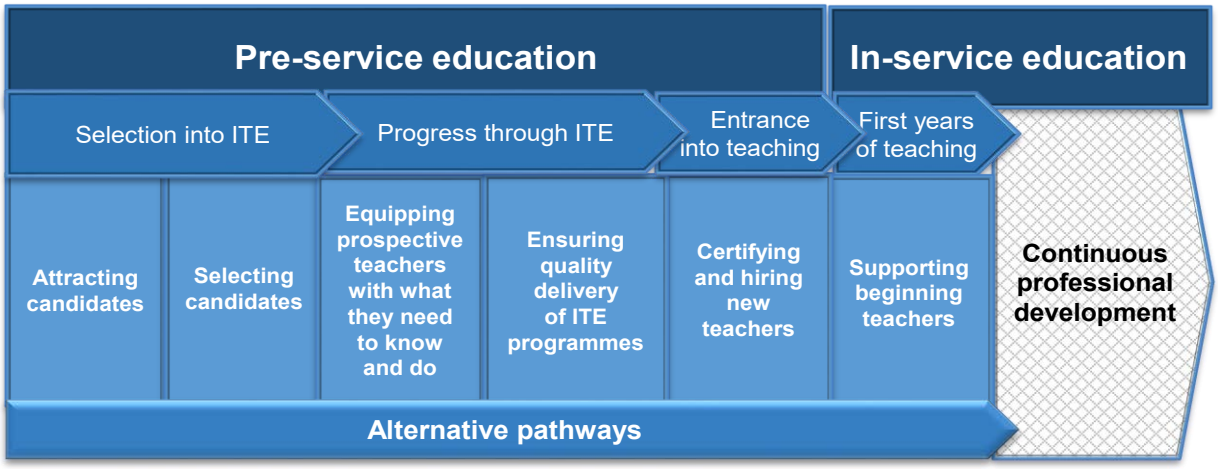
1.2. What is an initial teacher preparation system?

1.2.1. ITP as a continuum

Studies exploring the effectiveness of teacher education often conceptualised this as an individual teacher attribute looking at a narrow set of variables as proxies for teacher competences such as degree, certification or structural features (Hammerness and Klette, 2015[7]; König and Mulder, 2014[9]). As König and Mulder (2014[9]) underline, this is one of the reasons for a lack of understanding in how teacher education works. The authors propose an approach that models teacher education as a system, starting with the selection of teacher candidates, and including the development of relevant competences, as well as the allocation of teachers to schools (König and Mulder, 2014[9]). In the same vein, Roberts-Hull, Jensen and Cooper (2015[10]) highlight that for teacher policies to work coherently towards an objective, teacher education has to be viewed as a pathway in its entirety, "encompassing the selection of candidates, progression within a course, graduation requirements, registration and employment, induction and early career development" (Roberts-Hull, Jensen and Cooper, 2015, p. 4[10]).

Increasingly more policy documents promote a system-level approach that conceptualises teacher education as a continuum of teachers' professional growth and development, and on which initial teacher education is an intrinsic part (European Commission, 2015[11]). The ITP study adopted this systemic continuum approach basing its framework on Roberts-Hull, Jensen and Cooper's Teacher Education Pathway Model (Roberts-Hull, Jensen and Cooper, 2015[10]). Rather than a conceptual framework, this model serves as an organising frame to describe the different stages of ITP at which policy interventions can directly be targeted. Thus, the model was conceived to suit the purposes of the policy reviews of the ITP study: it served as a basis for the interviews, and for collecting and organising resources and practices.

Figure 1.1. Teacher Education Pathway Model



Source: Adapted from Roberts-Hull, K., B. Jensen and S. Cooper (2015), A New Approach: Reforming teacher education, Learning First, Australia.

In the OECD Teacher Education Pathway model, initial teacher preparation encompasses pre-service education and preparation during the first years of teaching. The former is often also referred to as initial teacher education (ITE), while the latter can have different

forms depending on the system, such as a formal induction programme, formal or informal mentoring schemes. The model (Figure 1.1) lays out four consecutive stages within the pathway for teachers from when candidates are selected into ITE programmes, complete the ITE programme, enter teaching and spend their first years in the profession. These stages are further divided into six more specific themes altogether. The model considers that selection starts with attracting candidates into teacher education. Progressing through ITE highlights two strongly interrelated factors: equipping teacher candidates with appropriate knowledge and skills, and ensuring that this happens in a high-quality manner.

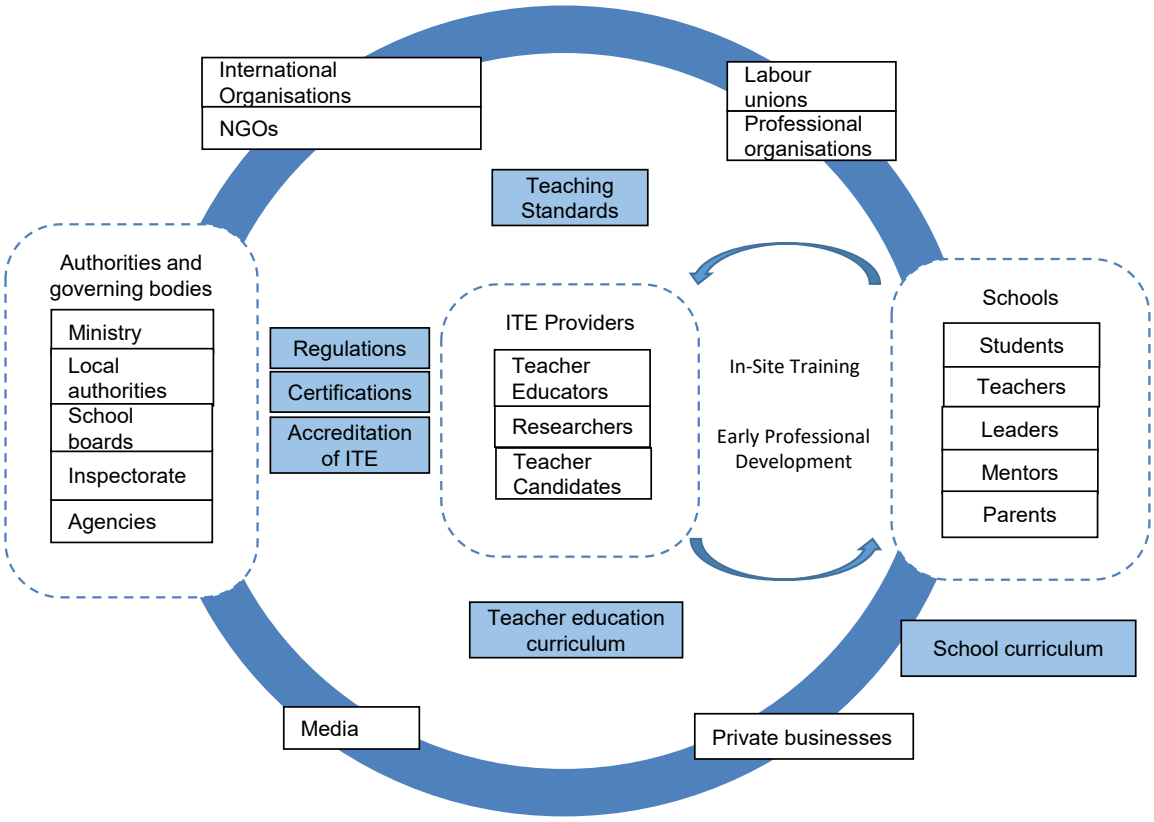
The model also considers so-called "alternative" routes into the profession to account for the development of non-traditional pathways to teaching (e.g. Teach for All or second career fast-track training). Continuous professional development is the stage that follows ITP and is part of the model to emphasise the conceptual understanding of teacher learning as a continuum. However, the reviews in this study did not focus on this latter element, therefore this is not part of the current analysis.

1.2.2. ITP as a system

Initial teacher preparation does not stand in a vacuum, it is governed as part of the education system as a whole, and is embedded in the wider social, cultural and economic context of a country. Education systems are complex systems (Burns and Köster, 2016[12]), defined as the ensemble of multiple agents that influence the different elements by interacting at multiple levels (Burns and Köster, 2016[13]). An ITP *system*, as a subset of education can thus be defined as "the multi-layered and loosely-boundaried group of people and things that contribute to the learning of teacher candidates" and teachers in their early career (Ell et al., 2017, p. 331[14]). The following section demonstrates the complexity of the ITP system by looking at how the interactions of different agents – including human actors, organisations and material artefacts – shape it.

Today's education systems are characterised by a greater number of stakeholders than ever before (Burns, Köster and Fuster, 2016[15]). Almost all educational stakeholders can play a role in shaping ITP, which makes it challenging to identify and appropriately address the interests of all key actors.

Figure 1.2. Potential actors and artefacts in ITP systems



Source: Adapted from Burns and Köster (2016[12]), "Modern governance challenges in education", http://dx.doi.org/10.1787/9789264255364-3-en, pp. 25.

Considering Figure 1.2 from the point of view of teacher education, training providers are certainly key players. However, ITP also takes place in schools (during teaching practicum and induction), making school leaders, teachers, mentors but even parents and students important actors. For example, teachers can be mentors for teacher candidates or newly qualified teachers, that is, teacher educators themselves, but they can also shape new teachers' learning by simply playing key roles in their socialisation into the profession as teacher colleagues (Simmie et al., 2017[16]; Paniagua and Sánchez-Martí, 2018[17]).

Similarly, researchers can also potentially shape the system through producing evidence relevant for policy, for example, on the effectiveness of teacher education and professional development (Révai and Guerriero, 2017[18]). They can also play multiple roles being at the same time teacher educators, or having policy-advisory or consultancy roles. These multiple roles allow researchers to act at multiple points of the system.

The local, regional, national authorities (e.g. ministry, agencies, inspectorate) play a crucial role in shaping ITP systems, for example, by setting teacher standards, regulating selection into teacher education and qualification or licencing, setting up accountability systems for teacher education institutions, and so on.

In addition to the three main sites – ITE providers, schools, and authorities and governing bodies – there are a number of other actors who can play different roles depending on the

system. For example, private businesses in many countries provide non-formal learning opportunities for teachers including in their early career. International organisations, NGOs, labour unions, other professional organisations and the media can exert influence on different aspects of ITP. These include influencing the status of the teaching profession and different ITP policies through providing data, conveying perceptions and opinions, or directly participating in certain policy mechanisms such as standard setting, accreditation processes, etc.

Besides human actors, an ITP system also encompasses a number of artefacts (represented in blue in Figure 1.2). Teaching standards, teacher education programmes and curriculum, school curriculum, accreditation criteria, regulations, and various other documents can become agents of change. For example, teaching standards can directly or indirectly, through accreditation processes, influence the content of teacher education programmes (Révai, 2018[19]). Regulations of entry into teacher education can influence its curriculum (e.g. if a degree in a specific subject is required to enter teacher education, less or no focus can be given on subject content knowledge). Similarly, a change in the school curriculum can have an impact on the content of initial and continuous teacher education courses. The artefacts exert their influence through processes in which actors (the stakeholders described above) engage with them and interact with each other. The nodes and interconnections of the network of the diverse ITP stakeholders and artefacts will depend on the education system of a particular country.

Analysing education systems in general, and ITP specifically, through the lens of complexity is particularly helpful to understand change (Mason, 2016[20]; Ell et al., 2017[14]). A complex system is changing as a result of interactions among its elements. This evolution is driven by "feedback loops", as interactions provide feedback on the elements, their relationships and actions (Snyder, 2013[21]). Feedback can move the system closer to an objective (positive feedback), but it can also impede change and "lock" the system in a stagnant state (negative feedback) (Snyder, 2013[21]). For example, when new teaching standards are introduced, these can set new requirements for initial teacher education, and can induce change in what and how teachers learn. Estonia is an example for such a positive feedback loop: one of its major ITE providers revised its teacher education programme based on new teaching standards (Révai, 2018[19]). On the other hand, when teaching standards are not revised, they can also impede change in teacher education, when institutions have to respond to accreditation criteria based on fixed or outdated standards. Feedback loops also include the way in which the continuous exchange of information among ITP stakeholders drive system change. For example, Singapore updated its ITE curriculum based on feedback from schools. Ensuring positive feedback loops is thus vital to successful educational change (Mason, 2008[22]; Snyder, 2013[21]).

To sum up, in order to identify the obstacles to establishing and sustaining a high-quality ITP system at the root, and to understand how change can occur, this report examines ITP not as an isolated component, but as the start of the teacher learning continuum and as an integral part of the whole education system.

1.3. Key challenges in initial teacher preparation and how to address them

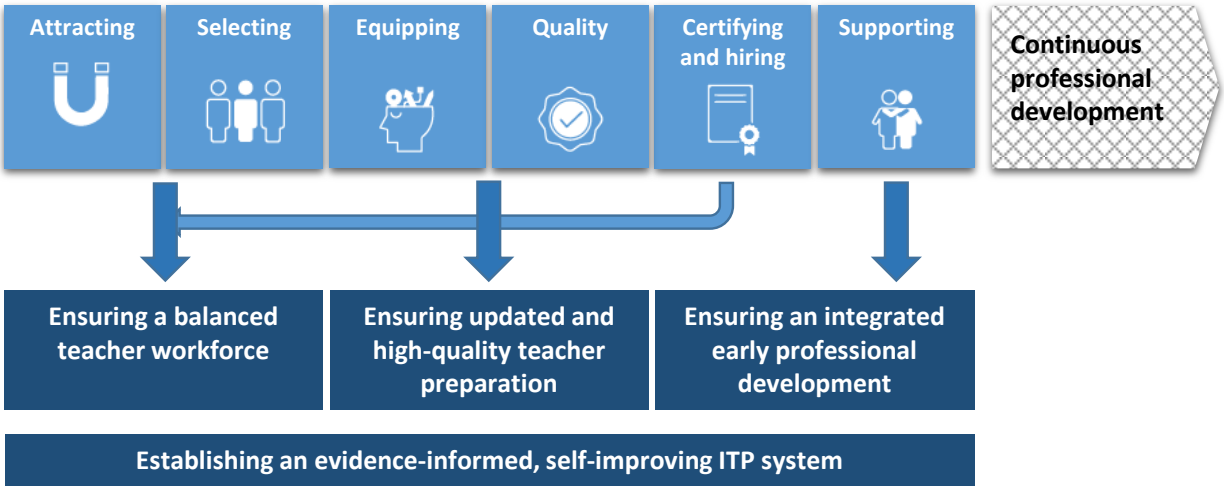
The ITP reviews conducted in the study identified strengths, weaknesses, opportunities and threats linked to each of the six stages of the Teacher Education Pathway Model. This approach was adopted in six of the participating countries (Australia, Japan, Korea, the Netherlands, Norway, United States). The purpose of the review in Wales had a more

specific aim, namely to support the Welsh Government in its endeavour to strengthen evidence-based pedagogical principles in ITE, and to help building greater capacity for research in teacher education. Because of this more specific objective, the analysis only looked at the stage of Equipping teachers in Wales. All the 37 theme- and country-specific SWOT analyses are available on the Teacher Ready! platform.

In order to identify those "key nodes" of the system that are the most crucial to be targeted to create high-quality ITP, the SWOTs were analysed and discussed with a number of stakeholders and experts. While ITP systems are characterised by the unique contexts of the country including the institutional structures and cultures, this exercise revealed a certain number of common challenges across the seven participating countries, as well as some emerging strategies to address these (see Figure 1.3).

The first of these challenges is a global one: how can we establish an evidence-informed ITP system? Designing and implementing policies based on evidence is a key aspect of the whole teacher education pathway. However, there are also a number of more specific challenges that are connected to certain stages of the pathway. Thus, a second challenge is ensuring a balanced educator workforce. While this is a systemic challenge, when translated to ITP, it is mostly directly connected to attracting, selecting, and certifying and hiring teachers. The description in Chapter 3 will nevertheless illustrate the ways in which it also connects to other pieces of the teacher education pathway. The third challenge – regularly updating the content of ITE and ensuring quality learning opportunities – is at the core of equipping teachers with appropriate knowledge and skills, as well as quality delivery. Finally, ensuring an appropriate support system for teacher candidates and new teachers is a specific challenge of the last stage of ITP and it plays a fundamental role in creating a smooth transition to professional practice and setting the ground for a coherent experience of career-long learning.

Figure 1.3. The four greatest challenges of ITP systems



In the process of policy making, these challenges can easily be translated into key policy objectives. Bringing about educational change requires clearly defined objectives and the implementation process is complex (Viennet and Pont, 2017[23]). It has to build on a coherent strategy that has many different facets and that has to take into account the context (Viennet and Pont, 2017[23]). To facilitate the complex process of policy

implementation, this report proposes a number of strategies to address each of the challenges.

The policy strategies draw both on the evidence available in the international literature and on the practices identified in the ITP reviews in this study. However, these strategies have to be treated with caution for two reasons. First, evidence on the effectiveness of certain policy strategies is still scarce and sometimes controversial. This issue is discussed in regards to the global challenge of evidence-informed ITP systems in Chapter 2, and the report explicitly points to evidence gaps in most other sections as well. Second, while some of the practices collected in the reviews seem promising in the sense that stakeholders reported positive perceptions, many had not been comprehensively evaluated at the time of the review. In fact, the review team identified a number of ways to improve all practices. Details on why the practices were perceived as promising as well as suggestions to improve them further, can be found on the Teacher Ready! platform.

The policy process necessitates continuous interaction between the different actors – policy makers, implementers at different levels, and those working in institutions and schools (teacher educators, school leaders, teachers, etc.) (Viennet and Pont, 2017[23]). For such interaction to happen, engaging stakeholders in a conscious, deliberate and inclusive manner is fundamental (Viennet and Pont, 2017[23]). To facilitate reflections in this direction, the report offers strategies not only for policy makers, but also for other actors playing a role in the implementation process. Who these stakeholders are of course varies depending on the challenge and the kinds of strategies considered. Thus, in some sections the reader will find suggestions for professionals (teacher educators, teachers), in other sections for institutions (ITE, schools) more generally, and, in certain cases, strategies will only focus on one stakeholder group or type of institution. Nevertheless, the suggested strategies for the given groups may not be relevant for each system and context, because the relevant stakeholders in a certain policy process largely depend on the system (e.g. whether teachers have room for manoeuvre over certain aspects varies greatly across countries).

Finally, a last point of caution: due to the complex interconnections among the agents (both human actors and material artefacts) described in section 1.2, the challenges identified will inevitably overlap with one another. Similarly, the policy strategies proposed to address these challenges cannot be entirely disentangled. A number of cross-references throughout the report make the synergetic and complementary nature of the challenges and policy strategies visible.

References

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [12]

Burns, T. and F. Köster (2016), "Modern governance challenges in education", in Burns, T. and F. Köster (eds.), *Governing Education in a Complex World*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264255364-3-en. [13]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [15]

Darling-Hammond, L. (2006), *Powerful Teacher Education : Lessons from Exemplary Programs*, Jossey-Bass. [5]

Darling-Hammond, L. (2000), "Teacher Quality and Student Achievement: A Review of State Policy Evidence", Vol. 8/1. [3]

Ell, F. et al. (2017), "Mapping a complex system: what influences teacher learning during initial teacher education?", *Asia-Pacific Journal of Teacher Education*, Vol. 45/4, pp. 327-345, http://dx.doi.org/10.1080/1359866x.2017.1309640. [14]

European Commission (2015), *Shaping career-long perspectives on teaching: A guide on policies to improve initial teacher education*, Education & Training 2020 - Schools Policy, Brussels, http://ec.europa.eu/dgs/education_culture/repository/education/library/reports/initial-teacher-education_en.pdf. [11]

Grossman, P., K. Hammerness and M. McDonald (2009), "Redefining teaching, re-imagining teacher education", *Teachers and Teaching*, Vol. 15/2, pp. 273-289, http://dx.doi.org/10.1080/13540600902875340. [6]

Hammerness, K. and K. Klette (2015), "Indicators of quality in teacher education: Looking at features of teacher education from an international perspective", in *Promoting and Sustaining a Quality Teacher Workforce*, Emerald Group Publishing Limited, http://www.emeraldinsight.com/doi/abs/10.1108/S1479-367920140000027013. [7]

Hanushek, E., J. Kain and S. Rivkin (1998), *Teachers, Schools, and Academic Achievement*, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w6691. [4]

König, C. and R. Mulder (2014), "A change in perspective –Teacher education as an open system", *Frontline Learning Research*, Vol. 4, pp. 26-45, http://dx.doi.org/10.14786/flr.v2i4.109. [9]

Low, E. et al. (2012), "Towards evidence-based initial teacher education in Singapore: A review of current literature", *Australian Journal of Teacher Education*, Vol. 37/5, pp. 65-77, http://dx.doi.org/10.14221/ajte.2012v37n5.3. [8]

Mason, M. (2016), "Complexity theory and systemic change in education governance", in Burns, T. and F. Köster (eds.), *Governing Education in a Complex World*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-4-en. [20]

Mason, M. (2008), "What is complexity theory and what are its implications for educational change?", *Educational Philosophy and Theory*, Vol. 40/1, pp. 35-49, http://dx.doi.org/10.1111/j.1469-5812.2007.00413.x. [22]

OECD (2015), *Education Policy Outlook 2015: Making Reforms Happen*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264225442-en. [1]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [2]

Paniagua, A. and A. Sánchez-Martí (2018), "Early Career Teachers: Pioneers Triggering Innovation or Compliant Professionals?", *OECD Education Working Papers*, No. 190, OECD Publishing, Paris, https://dx.doi.org/10.1787/4a7043f9-en. [17]

Révai, N. (2018), "What difference do standards make to educating teachers?: A review with case studies on Australia, Estonia and Singapore", *OECD Education Working Papers*, No. 174, OECD Publishing, Paris, https://dx.doi.org/10.1787/f1cb24d5-en. [19]

Révai, N. and S. Guerriero (2017), "Knowledge dynamics in the teaching profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-4-en. [18]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [10]

Simmie, G. et al. (2017), "Discursive positioning of beginning teachers' professional learning during induction: a critical literature review from 2004 to 2014", *Asia-Pacific Journal of Teacher Education*, Vol. 45/5, pp. 505-519, http://dx.doi.org/10.1080/1359866X.2017.1280598. [16]

Snyder, S. (2013), "The Simple, the Complicated, and the Complex: Educational Reform Through the Lens of Complexity Theory", *OECD Education Working Papers*, No. 96, OECD Publishing, Paris, https://dx.doi.org/10.1787/5k3txnpt1lnr-en. [21]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [23]

Chapter 2. How can we ensure an evidence-informed, self-improving initial teacher preparation system?

This chapter discusses three key challenges of ensuring evidence-informed, self-improving initial teacher preparation (ITP) systems. First, it notes the lack of rigorous research that could underpin ITP policies and practices by describing available evidence as well as major research gaps. Second, it explores the difficulties related to the use of evidence, in particular, to mediating knowledge, accessing and analysing available data, etc. Third, it discusses barriers to designing ITP in an evidence-based manner as a result of the often conflicting institutional contexts. The second and third sections of the chapter propose strategies to address these challenges. In particular, they discuss how different stakeholders can support building evidence, build continuous improvement in existing processes such as accreditation, and more effectively disseminate and use evidence across the system.

A key challenge in many initial teacher preparation (ITP) systems is the production and use of evidence to foster evidence-informed policymaking at the system level and evidence-informed design, delivery and improvement of ITP programmes. A lack of rigorous research on ITP practices and the implementation of policy create the opportunity for a myriad of approaches in ITP and little way to evaluate their potential. A 2014 review of the international research evidence on high quality teacher education found that the best programmes are underpinned by a clear understanding of how beginning teachers learn to teach and that programmes themselves are the subject of ongoing research and development for improvement (BERA, 2014[1]).

Effective knowledge production and use is an important part of a coherent, self-improving ITP system (Roberts-Hull, Jensen and Cooper, 2015[2]). Knowledge can consist of formal research knowledge, indicators, and the professional knowledge of teachers and practitioners as well as broader education stakeholders and policy makers. The production and use of knowledge is interconnected with a system's governance mechanisms including policy design and implementation, accountability and priority setting (Burns, Köster and Fuster, 2016[3]).

Evidence – "the available knowledge and information indicating whether a belief or proposition is true or valid" [1] – is an important form of knowledge in an ITP system. What constitutes evidence is debated in many systems and is often subject to a country's research traditions. Specific research questions and robust research methodologies suited to that type of question can help convert data and knowledge into evidence (OECD, 2007[4]).

This chapter of the report discusses the production and utilisation of evidence about ITP policies, programmes and practices relevant for the overall design of ITP systems. Chapter 4 addresses the production and utilisation of evidence about teaching and learning that are used within ITP programme content and enacted by teachers in schools.

2.1. Why is this a challenge?

2.1.1. Building rigorous evidence about ITP policies and practices

Despite growing research interest in teacher preparation, there are very few systematic reviews on ITP programmes and practices (du Plooy et al., 2016[5]), only a small number of large-scale multi-programme research studies (Cochran-Smith and Zeichner, 2005[6]; Cochran-Smith et al., 2015[7]), and little research on policy implementation in ITP (Peck, Gallucci and Sloan, 2010[8]).

A review of more than 1 500 empirical, peer-reviewed studies published in the United States and in major international sources between 2000 and 2012 on teacher preparation categorised the research into three clusters: teacher preparation accountability, effectiveness, and policies; teacher preparation for the knowledge society and teacher preparation for diversity and equity (Cochran-Smith and Villegas, 2015[9]), as described in Table 2.1.

Table 2.1. Major programmes and clusters of research on teacher preparation

Cluster	Research Program A: Teacher Preparation Accountability, Effectiveness, and Policies
A1	Alternative certification and pathways
A2	Policy responses and trends
A3	Testing and assessment
A4	Program evaluation
	Research Program B: Teacher Preparation for the Knowledge Society
B1	Preparing teachers to teach science subject matter
B2	The influence of coursework on learning to teach
B3	The influence of fieldwork on learning to teach
B4	Content, structures, and pedagogy of teacher preparation for the knowledge society
B5	Teacher educators as teachers and learners
B6	Teacher preparation and learning to teach over time
	Research Program C: Teacher Preparation for Diversity and Equity
C1	The influence of coursework and fieldwork on learning to teach diverse student populations
C2	Recruiting and preparing a diverse teaching force
C3	Content, structures, and pedagogies of teacher preparation for diversity
C4	Teacher educator learning for/experiences with diversity

Source: Cochran-Smith, M. and A. Villegas (2015[9]), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20.

Two key – but separate – research spaces in teacher preparation have developed in recent years. One large research space generates knowledge on teacher candidate learning and involves primarily small-scale, single site studies conducted by researchers who are also teacher educators. Although fewer in number, there are also some large-scale comparative research projects that look into teacher candidates' learning opportunities and how these relate to their knowledge (König et al., 2011[10]; König et al., 2017[11]). The second smaller space is related to research on teacher preparation policies such as human capital policies, personnel practices of school systems and teacher preparation providers (Cochran-Smith et al., 2015[7]). Both these research spaces produce knowledge that can inform teacher education policies including at the national and at the institutional levels.

Key gaps in the knowledge on teacher preparation include: effective practices across institutions; the relationship between specific ITP programme components and students' learning as opposed to solely focussing on teacher learning; how teacher preparation influences candidates practice in relation to specific teaching tasks and techniques in the classroom as opposed to general teacher candidates beliefs, understandings and reflective practices; deep research on equity and access, and the underlying impact of social, cultural and institutional factors; evaluation measures that are sensitive to programme content and quality; and effects over time (longitudinal research) (Wilson, Floden and Ferrini-Mundy, 2001[12]; Cochran-Smith et al., 2015[7]). The challenge for ITP systems is to support increasingly rigorous research on emerging practices to understand the interaction of different factors that constitute effective practices.

Some systems implement accountability policies to collect and publish data about ITP programmes as a means to build evidence and support improvement across the system (Darling-Hammond and Lieberman, 2012[13]). These data can be input or process measures such as number of enrolments and number of courses offered by the university, or they can be output measures such as certification results, employment outcomes, and candidate and principal feedback surveys (Toon, Jensen and Cooper, 2017[14]).

While there is some research evidence to suggest that increased accountability measures may contribute to improving the quality and outcomes of initial teacher preparation, the conditions under which this happens are not straightforward (Tatto et al., 2016[15]). The ultimate assessment of the effectiveness of ITP is the impact that graduates have on learner outcomes. Some researchers have found links between ITP programme quality and learner achievement (Boyd et al., 2009[16]), but others have found that measuring programme effectiveness through learner achievement rarely produces enough variability to distinguish between programmes (Gansle, Noell and Burns, 2012[17]; Koedel et al., 2015[18]). Causality is difficult to ascertain for many ITP outcomes. Using data like employment outcomes, for example, may not be the best measure of programme quality because many factors beyond the programme influence the employment outcomes of initial teacher education (ITE) graduates (Tatto et al., 2016[15]). An effective and fair means to collect evidence on ITP programme impact is important to improve ITP systems.

2.1.2. Supporting the use of evidence across the ITP system

Evidence is of little worth if stakeholders do not use it in the system. A strong evidence ecosystem supports the creation of practice-based evidence and drives the generation of evidence-informed practice and policy making (Deeble and Vaughan, 2018[19]). This requires research that is relevant to challenges teachers, teacher educators and policy makers face and evidence that is shared in meaningful and practical ways.

The use of evidence about ITP policies and practices in ITP policy making and programmes is inconsistent in many systems (Burns, Köster and Fuster, 2016[3]). The key factors affecting the use of research in general are: the nature of the research including quality and timeliness; personal characteristics of the researchers and research users including attitudes towards change; access to research either directly or through knowledge brokers or contacts; and, the context for the use of research such as organisational culture (Davies, 2007[20]).

Some systems have set up knowledge mediators or brokerage agencies to aid in education knowledge dissemination, translation and ultimately utilisation (Burns, Köster and Fuster, 2016[3]). For example, the Evidence for Policy and Practice Information and Co-ordinating (EPPI)-Centre in the United Kingdom, the What Works Clearinghouse in the United States, the Knowledge Chamber of the Netherlands, the Danish Knowledge Clearinghouse, or New Zealand's Best Evidence Synthesis Programme are different types of agencies which aim at facilitating information sharing and ensuring quality control (OECD, 2007[4]). These brokers can generate and source, synthesise, manage and promote utilisation of evidence to benefit researchers, practitioners, policy makers and commentators (Clinton, Aston and Quach, 2018[21]). Despite the need to improve knowledge dissemination and translation, there is little empirical record of the effectiveness and impact of knowledge mediation efforts (Burns, Köster and Fuster, 2016[3]). There is limited evidence from the ITP reviews that programmes are systematically using national knowledge brokers to inform their work.

Many ITP systems use accreditation processes to compel programmes to use evidence-based ITP practices, but systems often have a difficult time enforcing this requirement. Accreditation is traditionally focused on achieving compliance to a set of minimum standards. In systems that use this form of accreditation, most ITP programmes need only pass the standard and there are few incentives for them to improve beyond the minimum benchmark (Toon, Jensen and Cooper, 2017[14]).

Some systems fail to implement ongoing feedback mechanisms between policy makers, researchers, teacher educators, school leaders and teachers. Not all systems in the OECD ITP study, for example, routinely survey graduate teachers for feedback on their preparation, or evaluate the implementation of all major ITP policy reforms.

A survey on education information systems conducted as part of the OECD Centre for Educational Research and Innovation (CERI) Innovation Strategy for Education and Training project (OECD, 2018[22]) in 64 systems in 30 countries, identified a number of challenges for leveraging data for educational innovation and improvement (González-Sancho and Vincent-Lancrin, 2016[23]). While collecting and using data to improve education systems is becoming a prominent strategy in many countries, the limited integration of data management tools often constitutes a barrier to accessing and analysing the wealth of data generated in educational institutions. Regarding ITP, systems are rarely capable of linking data on teacher candidates, new teachers, ITE and school-based teacher educators collected in teacher education institutions, school boards and schools over time. A major challenge for many countries is to develop national or regional longitudinal education information systems that can facilitate data sharing and integration across institutions and levels of education and are capable of providing an easy use of information to different stakeholders. A central feature of advanced longitudinal information systems is to provide visualisation, analysis and reporting tools that facilitate their use for purposes such as forecasting workforce needs.

Findings of this study also suggests that while many countries are building such longitudinal information systems, most of these still lack key features to effectively exploit data. It is still a challenge to integrate flexible tools that allow faster feedback, and provide suggestions to take action. Moreover such systems are not yet accessible for a large number of stakeholders, partly due to lack of training opportunities in their use (González-Sancho and Vincent-Lancrin, 2016[23]).

2.1.3. Designing ITP in an evidence-informed and effective way

ITP programmes that use research as part of their approach to learning to teach and for programme improvement are generally more effective than those that do not (Tatto, 2015[24]).

The design of ITP must draw deeply on the specialist knowledge domains that underpin teacher education. This involves the growing evidence on the effectiveness of teacher education and continuous development programmes (Cordingley, 2015[25]; Cordingley and Bell, 2012[26]; Timperley et al., 2007[27]), research on curriculum review and refinement, and so on. Evidence and scholarship-based development in any given field of knowledge proceeds gradually and incrementally through research and testing. However, teacher education institutions often have limited space to test new designs.

Designing ITP in an evidence-informed way is also challenging because it requires accommodating a range of very different timescales and organisational priorities. Governments work to demanding political timescales and their rapid reforms can impose strong demands on ITP institutions. Changes have to be implemented across complex policy boundaries and responsibilities, which each have their own, often rather slower cycles (Burns and Köster, 2016[28]).

Developments in accredited, degree level academic programmes often have to work through higher education accreditation and quality assurance arrangements, which in many education systems work to longer term – across three to five year programme

review and accreditation – cycles (OECD, 2008[29]). Teacher education design, which has to be fit for the purpose of educating large numbers of teachers, thus has to be accommodated within often tri-annual cycles of teacher preparation, the rhythm of the university or college degree, and higher education quality assurance cycles.

2.2. What strategies can address the challenge?

2.2.1. Supporting rigorous and relevant research on ITP

An evidence-informed, self-improving ITP system supports the production of rigorous and relevant knowledge on ITP policies and practices. Knowledge can originate from research, i.e. a rigorous analysis of data and implications based on specific research questions and methodologies, or from system data sources such as quantitative data and qualitative information from teacher candidates, teachers and teacher educators (European Commission/EACEA/Eurydice, 2017[30]). Knowledge may be produced by higher education institutes, government bodies or other organisations via research projects, comprehensive evaluations and stakeholder consultations. Systems can facilitate knowledge production by others as well as directly produce knowledge through the state.

Systems can steer the type of knowledge produced by others through establishing grants, creating government-affiliated or independent research centres, and directly commissioning research (Burns, Köster and Fuster, 2016[3]).

A national research strategy is a key component to steer the effective production of knowledge about ITP policies and practices. National reviews on ITP in countries such as Australia and Wales have raised concerns about the lack of a co-ordinated national research strategy to build research on teacher preparation where it is currently lacking (BERA, 2014[1]; TEMAG, 2014[31]). A national research strategy helps support teacher preparation research across every level of the system from the individual school, through local and regional networks, to the wider research community based in universities and other research organisations.

Systems can directly produce knowledge through government organisations such as statistical offices, oversight committees or independent evaluations of government-initiated pilots in policy implementation (Burns, Köster and Fuster, 2016[3]). The OECD ITP study found that OECD countries are increasingly collecting ITE programme data across their systems and making this publicly available for stakeholders. National data strategies are being developed in countries such as Australia (Australian Teacher Workforce Data Strategy) and the United States (Deans for Impact, Table 2.3/7) to collect ITE programme data for workforce planning, policy and programme evaluation and research. National data strategies are being developed in countries such as Australia (Australian Teacher Workforce Data Strategy) and the United States (Deans for Impact) to collect ITE programme data for workforce planning, policy and programme evaluation and research. Other OECD countries, such as the Netherlands, implement national surveys to seek feedback from beginning teachers and publish reports analysing the findings from the survey to identify system-wide strengths and areas for improvement in relation to ITE. Some countries undertake and publish comprehensive evaluations of selected ITP policy implementation.

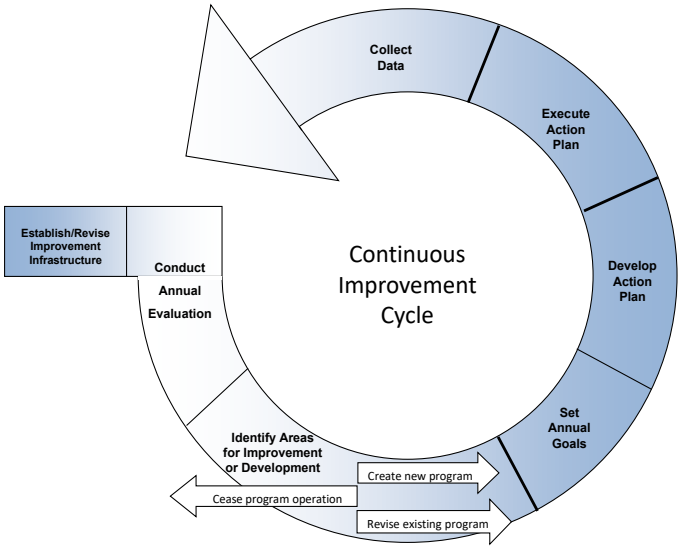
2.2.2. Introducing accreditation that incentivises ITP institutions to build their own evidence and implement a continuous improvement approach

With an increasing need for monitoring and controlling the quality of services, accountability, systemic evaluation and assessment, and different forms of audit have been on the rise in OECD countries (OECD, 2008[29]; OECD, 2013[32]). Quality assurance in higher education has two main, sometimes conflicting, purposes: 1) accountability to provide an objective measurement to demonstrate quality, and 2) improvement, i.e. a formative approach to understand how performance can be improved in the future (OECD, 2008[29]). For example, many countries introduced accreditation systems for higher education programmes to monitor and ensure their quality (OECD, 2008[29]). Where teacher education takes place in universities, ITE programmes often fall under the general accreditation processes such as in the Netherlands, Norway and Japan among countries participating in the ITP study. Other countries, such as Australia and some states in the US, have additional accreditation processes specifically for ITE programmes (Table 2.3/1,8). While positioning requirements for ITE within the overall higher education quality assurance frameworks creates coherence in the system, addressing the challenges described in this section also require processes specific to ITE programmes in addition to generic higher education requirements.

Systems can compel ITE programmes to use evidence through compliance-focussed accountability mechanisms. However, this often results in accreditation and quality assurance processes that mostly focus on outcome measures and ensuring minimal benchmarks (Toon, Jensen and Cooper, 2017[14]), which was also noted in the OECD ITP study. Moreover, too much central control and strongly prescribed processes can stifle innovation and the ability for institutions to act on feedback from schools and teacher candidates (Peck, Gallucci and Sloan, 2010[8]). Part of the challenge is to incorporate the latest evidence on effective ITP practices in a timely manner, when accreditation and quality assurance arrangements in many education systems function in longer term cycles (across three to five years).

A more productive approach is to encourage the development of organisational policies and practices related to continuous programme improvement (Peck and Davis, 2018[33]). To achieve this and accommodate innovation in ITP programmes through accountability, quality assurance systems should also focus on processes and improvement (Toon, Jensen and Cooper, 2017[14]). It is therefore important for any quality assurance system to not only allow a certain degree of flexibility for ITE institutions, but also specifically incentivise them to continuously update and adapt their programme to integrate emerging evidence on ITP practices.

Figure 2.1. Massachusetts continuous improvement cycle



Source: MA DESE (2016[34]), Program Approval Guidelines.

In addition, quality assurance processes in some systems impose burdensome administration on institutions, and there is a risk that satisfying criteria becomes mostly an administrative procedure rather than real improvement (OECD, 2008[29]). Also, institutions may not be willing to share data in a way needed for continuous improvement if they feel it will be used to judge them. Such processes should therefore be designed in a way to encourage institutions to promote self-reflection, and implement a continuous improvement approach. The questions underlying such an approach focus on what and how an ITE institution is learning to improve their programmes and less on the production of artefacts that document data collection and improvement processes (Peck and Davis, 2018[33]).

An example for an approach to promoting the use of evidence in continuous improvement is outlined in the programme approval guidelines for ITE providers in the state of Massachusetts (US) (Table 2.3/8). ITE providers assess their programmes on a yearly basis following a set of pre-defined criteria (MA DESE, 2016[35]). They identify areas for improvement based on the assessment, set annual goals, and develop and implement an action plan for achieving them (Figure 2.1) (MA DESE, 2016[34]).

2.2.3. Fostering the dissemination and utilisation of evidence throughout the system

An evidence-informed, self-improving ITP system supports the dissemination and utilisation of knowledge about ITP policies and practices to stakeholders across the system.

Individuals, organisations and processes are key in knowledge dissemination. Strategies for knowledge mediation at the level of the individual include training, interactions with other stakeholders, and personal movement around a system (Burns, Köster and Fuster, 2016[3]). Teacher educators, in particular, play a key role in mediating research evidence for candidate teachers (Sonmark et al., 2017[36]).

Strategies at the organisational and process levels can be more easily spread and sustained than strategies that target individuals. Knowledge brokers are organisations that are created specifically to disseminate knowledge across a system (Burns, Köster and Fuster, 2016[3]). Stakeholders interviewed for the OECD ITP Study rarely mentioned the use of knowledge brokers, despite these intermediaries existing in several review countries including Australia (Evidence for Learning), the United Kingdom (EPPI-Centre, Centre for the Use of Research and Evidence in Education [CUREE] and the Sutton Trust-Education Endowment Foundation and its Teaching and Learning Toolkit), Norway (the Knowledge Centre) and the United States (The Institute of Education Science and its What Works Clearinghouse). While this does not mean that systems do not benefit from such organisations, it might be worth exploring how teacher education institutions and ITP programmes can better draw on knowledge brokers. At the same time, systems could also use other processes to help support stakeholders to use knowledge. Processes of knowledge mediation may involve interaction with key stakeholders, stakeholder involvement in the production of knowledge, and technology platforms and communication channels to regularly disseminate knowledge (Burns, Köster and Fuster, 2016[3]).

The use of research and evidence to inform policy is of increasing focus in OECD countries (OECD, 2007[4]). A 2014 British review of research in teacher education argued that in a "research-rich, self-improving education system", policy makers of all persuasions – and those who seek to influence policy – encourage, and are responsive to the findings of educational research, both in policy formulation and in implementation strategies" (BERA, 2014, p. 25[1]). Systems that use evidence in their policy design, implementation and evaluation collect extensive policy and programme data, conduct numerous stakeholder interviews and review international literature to inform ITP policies.

Embedding continually evolving knowledge of effective ITP practice into programmes is a challenging, yet important aspect of utilising evidence in a system. Evidence-informed review and refinement of programme design, structure and pedagogies should be incorporated into the programme improvement processes. Both the design and the review process for ITP programmes should be underpinned by strong partnerships among all stakeholders, including accreditation authorities, ITP leaders, etc. Such principles help ensuring rapid flows of newly emerging knowledge and evidence.

2.3. How can the different actors apply these strategies?

2.3.1. What can policy makers do?

Creating a national research strategy and supporting research partnerships and centres of excellence

Policy makers can work with ITP stakeholders to create a national strategy on priority areas to research in teacher education and help coordinate research activities and funding across the system. For example, as part of the education reform programme, the

Welsh Government has been investing in strengthening the relationship between research and teacher education (Table 2.3/10) to improve Welsh education and meeting the aspirations of the new Welsh Curriculum (Welsh government, 2017[37]). Similarly, the 2014 review of teacher preparation in Australia recommended that the national teaching and school leadership body (the Australian Institute for Teaching and School Leadership - AITSL) extend its functions to provide a national focus on research into teacher education including into the effectiveness of teacher preparation and the promotion of innovative practice (Table 2.3/1) (TEMAG, 2014[38]).

Policy makers should involve various ITP and related system stakeholders in the development and implementation of their national research strategy, including researchers, teacher educators, school leaders and teachers. The 2014 review of teacher preparation in Australia recommended that the Australian Government work closely with higher education institutions and other agencies such as the Australian Research Council to ensure research grants related to teacher preparation support the development of a strong evidence base (TEMAG, 2014[38]). The same report also highlighted the opportunity for schools and ITE providers to establish mutually beneficial partnerships on research that can increase the quality of initial teacher education (Table 2.3/1) (TEMAG, 2014[38]).In other systems, policy makers have established policies to support research partnerships and centres of excellence to build and share research evidence on teacher preparation. The Norwegian Government established the Centre for Professional Learning in Teacher Education (ProTed), which is a partnership between two universities. In addition to running innovative teacher preparation programmes, ProTed conducts research projects and disseminates research findings on what constitutes excellent teacher education (see Table 2.3/5).

Box 2.1. Norway's Centre of Excellence for Professional Learning in Teacher Education

Best The Norwegian Ministry of Education and Research established "Centres of Excellence in Higher Education" (SFU) in 2010 as a prestige arrangement for educational activities in higher education (Table 2.3/5).

ProTed, Norway's Centre for Professional Learning in Teacher Education, is a joint venture between the universities in Oslo and Tromso to develop modes of collaboration between universities and schools, carry out systematic experiences of teaching, learning and supervision and contribute to the knowledge base about what constitutes excellent teacher education.

ProTed's research and development activities on teacher education are organised into five areas:

1. (Innovations) Progression and coherence
2. (Innovations) University schools and professional practice
3. (Innovations)Teacher education for the digital future
4. (Dissemination implementation) Building teacher education communities
5. (Dissemination implementation) Knowledge base for integrated study design

Creating a national ITP data strategy and supporting the collection and use of ITP programme data across the system

OECD member countries in the ITP study are increasingly using ITP programme data across their systems. These data can be input or process measures such as number of enrolments and number of courses offered by the university, or it can be output measures such as certification results, employment outcomes, and candidate and principal feedback surveys. The effective collection and use of data by stakeholders in an ITP system can support continuous improvement of ITP programmes and practices – though it is not often straightforward (Tatto et al., 2016[15]).

Countries use various mechanisms to support the collection and use of data, including national data strategies, accountability mechanisms that require the publication of programme effectiveness data, and candidate performance assessments.

Australia is implementing the collection of a national teaching workforce dataset (Australian Teacher Workforce Data - ATWD) to help understand the teacher workforce on a national scale and to facilitate robust modelling about Australia's approximately 400 000 practicing and preservice teachers for use by employers, policy makers and providers (see also section 3.3.1. in Chapter 3). Other initiatives in Australia such as the National Schools Interoperability Programme (NSIP) and the Learning Services Architecture (LSA) also have the potential to support integrated data for different stakeholders over time.

All universities in Japan are required to publish an annual report that contains data about ITE programmes, financial information, student enrolment and graduates' employment destinations for each ITE programme (Table 2.3/3).

A number of states in the US are developing state-wide data systems for accountability and evidence-informed programme improvement (Table 2.3/7). For example, Louisiana, Massachusetts, and Rhode Island collect and report data on ITE graduates (Rhode Island Department of Education, n.d.[39]; Louisiana Board of Regents, n.d.[40]), such as their persistence in teaching in public school and their students' performance on state-wide examinations.

Establishing flexible accreditation systems and guidelines that focus on continuous improvement

Effective ITE programmes collect and analyse data not as a form of compliance but as part of internal improvement (Peck, Gallucci and Sloan, 2010[8]). These programmes use data and evidence in structured improvement processes – to identify areas for improvement, create and execute a plan informed by evidence to address those areas, then evaluate the impact of their actions (Toon, Jensen and Cooper, 2017[14]). A system encourages evidence use in all programmes by supporting and recognising ITP institutions that implement formal improvement processes and foster a culture of improvement that involves the ongoing collection and analysis of data and evidence.

Policy makers need to make sure that accreditation systems for ITE programmes have a clear focus on improvement and processes, and allow for flexibility. An accreditation system exists in almost all of the countries participating in the OECD ITP study: Australia, Japan, the Netherlands, Norway, the US and Wales. The Norwegian Agency for Quality Assurance in Education – an independent expert body under the Ministry of Education and Research – implements an evaluation and accreditation approach that focuses on continuous improvement, self-accreditation and building capacity, while at the

same time entails tough consequences for non-compliance (Table 2.3/6). The Massachusetts accreditation system builds on the principle of continuous improvement. This principle is manifested in a regular review and reaccreditation of all programmes (see Section 2.2.2 and Table 2.3/8).

Australia has also made efforts to consolidate the multiple purposes of quality assurance by including continuous improvement, flexibility, diversity and innovation in its accreditation principles (Table 2.2 and Table 2.3/1).

Table 2.2. Principles for national accreditation of teacher education programmes in Australia

1. Impact	The accreditation process relies on evidence about the programme's impact. Evidence of impact is drawn from both pre-service teacher performance and graduate outcomes.
2. Evidence-based	Evidence must underpin all elements of initial teacher education, from the design and delivery of programmes to the teaching practices taught within programmes. Evidence is the basis on which panels make accreditation recommendations.
3. Rigour	A relentless focus on rigour across all elements of the accreditation process is vital in assuring robust and nationally consistent decisions, as well as the quality of programmes and their graduates.
4. Continuous improvement	Accreditation contributes to the improvement of the quality of initial teacher education and consequently of teaching and learning in Australia. The ongoing cycle of review and reaccreditation will provide assurance of graduate teacher quality and building public confidence in the profession.
5. Flexibility, diversity and innovation	Accreditation encourages the capacity of providers to be innovative in the delivery of programmes to meet the diverse needs of students and the profession, as long as the programme can demonstrate a positive impact.
6. Partnerships	National accreditation is built around partnerships involving shared responsibilities and obligations among initial teacher education providers, education settings, teachers, employers, and Authorities and a shared commitment to improve initial teacher education and work in partnership to positively affect student learning and graduate outcomes.
7. Transparency	The accreditation process requires transparency across all elements of initial teacher education, from entrant selection to programme outcomes. This results in publically available data that is valid and comparable, as well as clarity for pre-service teachers about what to expect from initial teacher education and, in turn, what is expected of them throughout their course.
8. Research	Accreditation generates and relies upon a strong research base that informs programme design and delivery, and informs the continual improvement of teacher education programmes by providers.

Source: Adapted from AITSL (2015[41]), Accreditation of Initial Teacher Education Programs: Standards and Procedures.

Accreditation is however not the only way to ensure continuous improvement in ITE. Softer measures can include for example guidelines and peer-learning processes. The Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) is preparing guidelines for an "integrative teacher curriculum reform" to help teachers meet the demands of the national school curriculum and adapt modern approaches to teaching, such as active learning (Table 2.3/2). In Norway, national teacher preparation guidelines are used by teacher educators to frame the teacher education curriculum and its delivery (Table 2.3/5).

Box 2.2. The Role of the Norwegian Agency for Quality Assurance in Education

The Norwegian Agency for Quality Assurance in Education (NOKUT) reviews institutions every eight years as part of higher education quality assurance process. All evaluations and accreditation are conducted by expert panels appointed and organised by NOKUT, with tailored rules and composition depending on the kind of audit, accreditation or evaluation activity. When evaluating institutions, NOKUT reviews the institutions' internal quality assurance work and culture and aims at finding a good balance between accountability and improvement. To this extent, NOKUT can provide recommendations for how the institution should enhance the quality of its educational provision and quality assurance system, or sanction poor-performing institutions by rescinding accreditation for specific programmes, de-accredit an entire institution or take self-accreditation powers away from an institution (Table 2.3/6).

Supporting the use of evidence across the system through capability building, networks and convening

Policy makers can use various means to support the dissemination and use of evidence across the system. Evidence summaries and policy networks are two examples of how countries in the OECD ITP study support the dissemination and use of ITP evidence.

AITSL compiles and publishes evidence summaries on important topics for education professionals, including teacher educators. These are, for example, available on attrition rates for early career teachers and on what early career teachers say about induction.

In the US, the Council of Chief State School Officers (CCSSO) – composed of the highest ranking education official in each state – provides space where senior state policy makers can exchange ideas to improve education (Table 2.3/7). CCSSO convened a Network for Transforming Educator Preparation consisting of representatives from nine states. The network aimed to mobilise stakeholders, build a shared understanding of the system and key issues to address, develop consensus around a common vision, design and align transformation strategies, and provide support to implement the strategies. The network focussed on teacher certification policies and systems; programme approval policies, systems and standards; data systems to support continuous improvement; and stakeholder engagement. While support to the network concluded in 2017, the nine participating states are now sharing lessons learned to help other states prepare their teachers (CCSSO, 2017[42]).

Monitoring and evaluating ITP policy implementation

Regular data collection, monitoring and evaluation is a key component of effective policy implementation (Viennet and Pont, 2017[43]). Data collected throughout the policy implementation process, for example, allows policy makers to update their policy or implementation strategy if needed, or better tailor the implementation to local needs. Feedback loops are an important part of monitoring and evaluation – often the weakest link in the policy cycle and frequently skipped – and should involve a diverse set of stakeholders in the system (Burns, Köster and Fuster, 2016[3]).

The Dutch Ministry of Education, for example, conducts a survey of all newly qualified teachers, collects other information from schools and reviews this information with

various stakeholders to identify national trends and make policy recommendations (Nusche et al., 2014[44]).

2.3.2. What can teacher education institutions and the teacher educator profession do?

Conducting large-scale research studies

There is not enough large-scale, longitudinal, cross-institutional research in teacher preparation (Wilson, Floden and Ferrini-Mundy, 2001[12]; Cochran-Smith et al., 2015[7]). Teacher education institutions and teacher educators can build this kind of evidence by participating in large research projects that span institutions, years and countries. Researchers in Norway and the United States, for example, are collaborating on a study on student teacher experience that involves five different programmes based in five different countries (Canrinus et al., 2017[45]).

Collecting, sharing and using evidence from ITP practice across institutions

Some teacher education institutions collaborate with each other to collect, share and use data and evidence for improvement. Deans for Impact in the US is currently developing a Common Indicators System (CIS) to gather evidence of teacher-candidate knowledge and skills, and programme performance across institutions (see Box 2.3 and Table 2.3/7). In another US example, the University of Michigan has established TeachingWorks to identify and share high-impact practices in teacher education. TeachingWorks collaborates with researchers, practitioners, policy makers, schools and teacher preparation providers across the US and offers professional development, training, seminars and consultations to support teacher educators (Table 2.3/9). In Japan, a consortium of four ITP institutions – the Centre to Support Partnership in the Advancement of Teacher Education – is working on a model ITE programme to share best practice for coursework and practical training across the system (Table 2.3/4). In Japan, a consortium of four ITP institutions – the Centre to Support Partnership in the Advancement of Teacher Education – is working on a model ITE programme to share best practice for coursework and practical training across the system.

Box 2.3. Deans for Impact's Common Indicators System

Deans for Impact is a relatively new organisation, established in 2014. It addresses the core issues in ITP, such as large diversity in ITE programmes, validity in data collection of ITE programmes and the low status of Colleges of Education. The organisation works on three major initiatives: empowering leaders through a year-long fellowship for deans of ITE programmes; gathering common evidence and data through their Common Indicators System; and, influencing policy through research and advocacy.

A network of thirteen diverse ITP institutions (as part of Deans for Impact) is participating in a prototype to gather common evidence and data on teacher candidates' knowledge and skills, and programme performance. Data collected through the tool enables the institutions to engage in cross-institutional learning and contribute to the evidence base on teacher preparation (Table 2.3/7).

Table 2.3. Practices to ensure an evidence-informed, self-improving ITP system

Reference number	Title of practice	Country
1	New accreditation for initial teacher education programmes in Australia	Australia
2	Exploring the alignment of initial teacher education to the new national curriculum in Japan: Teaching for active learning	Japan
3	Annual reporting of data on initial teacher education programmes in Japan	Japan
4	Collaboration between and within universities, boards of education and schools in Japan	Japan
5	Center for Professional Learning in Teacher Education (ProTed): promoting innovation, research strategic partnerships and sharing of best practice in initial teacher education in Norway	Norway
6	The Role of the Norwegian Agency for Quality Assurance in Education	Norway
7	Cross-state networks for the improvement of teacher education: Deans for Impact	United States
8	Massachusetts' review and approval of ITE programmes	United States
9	TeachingWorks: A practice-based approach for preparing teachers in the United States	United States
10	Towards a research-informed, evidence-based reform agenda in initial teacher education in Wales	Wales (United Kingdom)

Note: Hyperlinks point to the description of Promising Practices identified in the ITP reviews accessible on the Teacher Ready! platform.

Notes

[1] en.oxforddictionaries.com/definition/evidence

References

AITSL (2015), *Accreditation of Initial Teacher Education Programs: Standards and Procedures*, https://www.aitsl.edu.au/docs/default-source/initial-teacher-education-resources/accreditation-of-ite-programs-in-australia.pdf (accessed on 30 December 2017). [41]

BERA, B. (2014), *Research and the teaching profession: Building the capacity for a self-improving education system. Final Report of the BERA-RSA Inquiry into the Role of Research in Teacher Education*, British Education Research Association, https://www.bera.ac.uk/wp-content/uploads/2013/12/BERA-RSA-Research-Teaching-Profession-FULL-REPORT-for-web.pdf. [1]

Boyd, D. et al. (2009), "Teacher Preparation and Student Achievement", *Educational Evaluation and Policy Analysis*, Vol. 31/4, pp. 416-440, http://dx.doi.org/10.3102/0162373709353129. [16]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [28]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [3]

Canrinus, E. et al. (2017), "Coherent teacher education programmes: Taking a student perspective", *Journal of Curriculum Studies*, Vol. 49/3, pp. 313-333. [45]

CCSSO (2017), *Transforming Educator Preparation: Lessons Learned from Leading States*, Council of Chief State School Officers, http://www.ccsso.org. (accessed on 5 February 2019). [42]

Clinton, J., R. Aston and J. Quach (2018), *Promoting evidence uptake in schools: A review of the key features of research and evidence institutions*, University of Melbourne, http://dx.doi.org/10.4225/49/5aa61c6c75a9e. [21]

Cochran-Smith, M. and A. Villegas (2015), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20. [9]

Cochran-Smith, M. et al. (2015), "Critiquing teacher preparation research: An overview of the field, part II", *Journal of Teacher Education*, Vol. 66/2, pp. 109-121, https://doi.org/10.1177/0022487114558268. [7]

Cochran-Smith, M. and K. Zeichner (2005), *Studying Teacher Education: The report of the AERA Panel on Research and Teacher Education*, American Educational Research Association, published by Lawrence Erlbaum Associates, https://books.google.fr/books?hl=en&lr=&id=hbiLAgAAQBAJ&oi=fnd&pg=PP1&dq=Studying+Teacher+Education:+The+Report+of+the+AERA+Panel+on+Research+and+Teacher+Education.+Lawrence+Erlbaum+Associates.+&ots=kvcbq8M6DT&sig=hrAHfWD_o5TPEUKJAicby2UxLwE (accessed on 1 October 2018). [6]

Cordingley, P. (2015), "The contribution of research to teachers' professional learning and development", *Oxford Review of Education*, Vol. 41/2, pp. 234-252, http://dx.doi.org/10.1080/03054985.2015.1020105. [25]

Cordingley, P. and M. Bell (2012), *Understanding What Enables High Quality Professional Learning*, CUREE and Pearson School Improvement, http://www.curee.co.uk (accessed on 18 February 2018). [26]

Darling-Hammond, L. and A. Lieberman (2012), *Teacher Education Around the World : Changing Policies and Practices*, Routledge, Abingdon, https://www.routledge.com/Teacher-Education-Around-the-World-Changing-Policies-and-Practices/Darling-Hammond-LIEBERMAN/p/book/9780415577014 (accessed on 4 October 2018). [13]

Davies, H. (2007), "Academic advice to practitioners—the role and use of research-based evidence", *Public Money and Management*, Vol. 27/4, pp. 232-235. [20]

Deeble, M. and T. Vaughan (2018), "An evidence broker for Australian schools", *Centre for Strategic Education*, Vol. 150. [19]

du Plooy, L. et al. (2016), "Searching for research results to inform the design of an initial professional teacher education programme for the foundation phase: A systematic review", *South African Journal of Childhood Education*, Vol. 6/1, pp. 1-8, http://dx.doi.org/10.4102/sajce.v6i1.285. [5]

European Commission/EACEA/Eurydice, E. (2017), *Support Mechanisms for Evidence-based PolicyMaking in Education (Eurydice Report)*, Publications Office of the European Union. [30]

Gansle, K., G. Noell and J. Burns (2012), "Do Student Achievement Outcomes Differ Across Teacher Preparation Programs? An Analysis of Teacher Education in Louisiana", *Journal of Teacher Education*, Vol. 63/5, pp. 304-317, http://dx.doi.org/10.1177/0022487112439894. [17]

González-Sancho, C. and S. Vincent-Lancrin (2016), "Transforming education by using a new generation of information systems", *Policy Futures in Education*, Vol. 14/6, pp. 741-758, http://dx.doi.org/10.1177/1478210316649287. [23]

Koedel, C. et al. (2015), "Teacher Preparation Programs and Teacher Quality: Are There Real Differences Across Programs", *Education Finance and Policy*, Vol. 10/4, pp. 508-534, http://dx.doi.org/10.1162/edfp_a_00172. [18]

König, J. et al. (2011), "General pedagogical knowledge of future middle school teachers: on the complex ecology of teacher education in the United States, Germany, and Taiwan", *Journal of Teacher Education*, Vol. 62/2, pp. 188-201, http://dx.doi.org/10.1177/0022487110388664. [10]

König, J. et al. (2017), "Effects of opportunities to learn in teacher preparation on future teachers' general pedagogical knowledge: Analyzing program characteristics and outcomes", *Studies in Educational Evaluation*, Based on the EMW data collection.
There was nothing on OTL quality, only content., pp. 122-133, http://dx.doi.org/10.1016/J.STUEDUC.2017.03.001. [11]

Louisiana Board of Regents (n.d.), *Teacher Preparation Data Dashboards & Fact Book*, https://regents.la.gov/divisions/planning-research-and-academic-affairs/academic-affairs/teacher-education-initiatives/teacher-preparation-data-dashboards-fact-book/ (accessed on 5 February 2019). [40]

MA DESE, M. (2016), *Educator Preparation: Program Approval Criteria List*, http://www.doe.mass.edu/edprep/evaltool/2017CriteriaList.pdf. [35]

MA DESE, M. (2016), *Program Approval Guidelines*, http://www.doe.mass.edu/edprep/ProgramApproval.pdf. [34]

Mandinach, E. and E. Gummer (eds.) (2018), *Building Capacity and Commitment for Data Use in Teacher Education Programs*, Routledge. [33]

Nusche, D. et al. (2014), *OECD Reviews of Evaluation and Assessment in Education: Netherlands 2014*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264211940-en. [44]

OECD (2018), *Innovation Strategy for Education and Training*, http://www.oecd.org/education/ceri/innovationstrategyforeducationandtraining.htm (accessed on 5 December 2018). [22]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [32]

OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, OECD Reviews of Tertiary Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264046535-en. [29]

OECD (2007), *Evidence in Education: Linking Research and Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264033672-en. [4]

Peck, C., C. Gallucci and T. Sloan (2010), "Negotiating implementation of high-stakes performance assessment policies in teacher education: from compliance to inquiry", *Journal of Teacher Education*, Vol. 61/5, pp. 451-463, http://dx.doi.org/10.1177/0022487109354520. [8]

Rhode Island Department of Education (n.d.), *Rhode Island Educator Preparation Index*, http://www3.ride.ri.gov/RIEdPrepIndex/ (accessed on 5 February 2019). [39]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [2]

Sonmark, K. et al. (2017), "Understanding teachers' pedagogical knowledge: report on an international pilot study", *OECD Education Working Papers*, No. 159, OECD Publishing, Paris, https://dx.doi.org/10.1787/43332ebd-en. [36]

Tatto, M. (2015), "The role of research in the policy and practice of quality teacher education: an international review", *Oxford Review of Education*, Vol. 41/2, pp. 171-201, http://dx.doi.org/10.1080/03054985.2015.1017405. [24]

Tatto, M. et al. (2016), "The emergence of high-stakes accountability policies in teacher preparation: an examination of the U.S. Department of Education's proposed regulations", *Education Policy Analysis Archives*, Vol. 24/0, p. 21, http://dx.doi.org/10.14507/epaa.24.2322. [15]

TEMAG (2014), *Action Now: Classroom Ready Teachers*, Teacher Education Ministerial Advisory Group, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_print.pdf. [38]

TEMAG, T. (2014), *Action Now: Classroom Ready Teachers (Teacher Education Ministerial Advisory Group Final Report)*, Australian Department of Education, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf. [31]

Timperley, H. et al. (2007), *Teacher Professional Learning and Development Best Evidence Synthesis Iteration [BES]*, New Zealand: Ministry of Education, Wellington, http://educationcounts.edcentre.govt.nz/goto/BES (accessed on 11 October 2018). [27]

Toon, D., B. Jensen and S. Cooper (2017), *Teaching Our Teachers: a Better Way - Continuous Improvement in Teacher Preparation*, Learning First, Melbourne, http://www.learningfirst.com. (accessed on 4 October 2018). [14]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [43]

Welsh government (2017), *Connecting Research and Teacher Education: Quality Enhancement for ITE Partnerships*, Education Directorate, Welsh Government,, http://learning.gov.wales/resources/browse-all/connecting-research-and-teacher-education/?lang=en. [37]

Wilson, S., R. Floden and J. Ferrini-Mundy (2001), *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, Center for the Study of Teaching and Policy, Washington DC, https://www.education.uw.edu/ctp/content/teacher-preparation-research-current-knowledge-gaps-and-recommendations (accessed on 4 October 2018). [12]

Chapter 3. How can we ensure a balanced teacher workforce?

This chapter discusses the challenges of ensuring a balanced teacher workforce focussing on the way these relate to initial teacher preparation (ITP). It first gives a short overview of the different facets of teacher supply and demand such as teacher shortages, oversupply, demographic characteristics, attrition and teacher diversity. The second section highlights three ITP-related strategies that can help addressing this challenge: using ITP data in forecasting workforce needs, raising the status of teacher education through building a solid knowledge base for teachers and ensuring quality teacher education, and attracting, selecting and hiring candidates who are likely to be committed to improving their professional competences throughout their career. Finally, the third section of the chapter illustrates how policy makers, teacher education institutions and schools can apply these strategies concretely in their practice and through introducing processes.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

This section gives a short overview of some of the facets of ensuring a balanced teacher workforce and focuses on how initial teacher preparation (ITP) in particular can contribute to addressing it. Ensuring and sustaining a balanced workforce, i.e. the right amount of high quality teachers in a well-distributed way across the system, is a challenge that relates to the education system as a whole. It is discussed in its complexity, including also educational staff other than teachers, in the upcoming OECD report on human resources (OECD, 2018[1]).

The delicate balance of teacher supply and demand is linked to ITP policies such as attracting and selecting candidates in initial teacher education (ITE), and certifying and hiring teachers in various ways:

- The quality and accessibility of ITP can influence future teacher supply. Attracting a sufficient number of candidates in teacher education is necessary for future supply.
- Teacher demand and supply imbalances can influence ITP provision. Teacher shortages can lead to creating faster tracks, lowering entry and qualification requirements or introducing alternative routes to teaching.

Establishing and sustaining a quality teaching workforce involves striking the right balance between supply and demand. Many countries around the world experience problems of teacher shortages, oversupply and unbalanced distribution. Almost 30% of students across the OECD study in schools where instruction is hindered by a lack of teaching staff as reported by principals, and the average is similar in the 35 partner countries/economies that participated in the 2015 PISA cycle (OECD, 2016[2]). In addition, around one out of five students is in a school where the principal reported to have inadequate or poorly qualified teaching staff (OECD, 2016[2]). Although the shortage trend in some subjects seems to be improving in many countries based on principal reports (OECD, 2018[3]), the supply and demand issue is in fact much more complex.

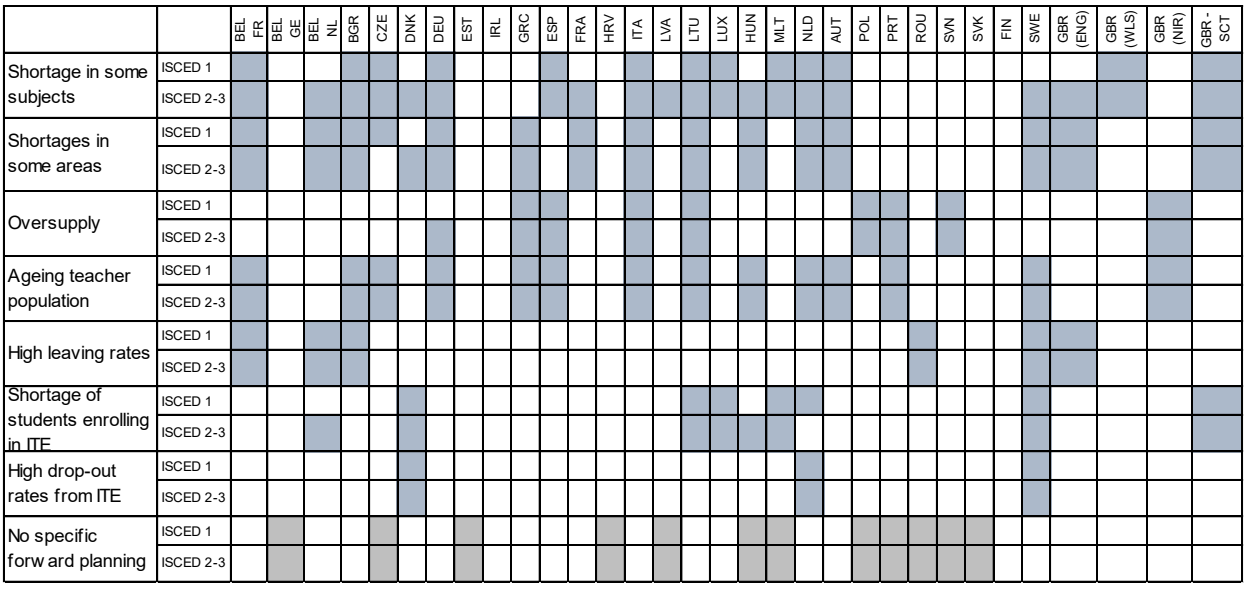
3.1. Why is this a challenge?

3.1.1. Striking the balance between supply and demand

An imbalance of teacher supply and demand can occur due to various reasons. A recent report by the European Commission, for example, identifies seven related challenges based on data collected from countries in the European Union (see Figure 3.1). As shown in the figure, the majority of these countries face the challenge of shortages in some subjects, in some geographical areas and ageing teacher population, while about half of them also experience oversupply. Several of the participating countries in the study, like Australia or the US, suffer from oversupply in specific areas and an undersupply in others. In Korea, ITE programmes in low demand areas, such as primary education, attract many candidates creating a pool of employable teachers who either cannot find a job or who teach outside their subject area.

Although to a lesser extent, high leaving rates from the profession, shortage of students enrolling in ITE and high drop-out rates from ITE have also been reported as challenges in some European countries (European Commission/EACEA/Eurydice, 2018[4]), and were noted in some countries participating in the ITP study such as Norway.

Figure 3.1. Main challenges in teacher supply and demand in primary and general secondary education (ISCED 1-3), 2016-2017, selected European countries



Source: European Commission/EACEA/Eurydice (2018, p. 25[4]), *Teaching Careers in Europe: Access, Progression and Support*, Luxembourg: Publications Office of the European Union.

This section shortly discusses five of the recurrent supply-demand issues and their relevance in the countries participating in the ITP study: teacher shortages, oversupply, demographic characteristics, attrition and teacher diversity.

Teacher shortages

Certain geographical areas suffer more of teacher shortages (understood here as a lack of teachers in terms of numbers), either due to their remoteness or due to other economic, social or cultural factors such as higher cost of living or higher concentration of disadvantaged families (European Commission/EACEA/Eurydice, 2018[4]). In 36 countries and economies, students in advantaged schools have greater access to education staff than do disadvantaged students (OECD, 2016[5]). Among countries participating in the ITP study, staffing remote areas is a pronounced challenge in Australia. Reduced access to educational facilities and personal amenities, a greater sense of social isolation and sometimes less satisfactory living arrangements contribute to the challenge to staff positions in rural, remote and low socio-economic status schools in Australia (TEMAG, 2014[6]). Similarly, Korea reported difficulty in attracting high quality candidates in remote areas, whereas there is an oversupply and strong competition in metropolitan cities. The distribution of experienced versus beginning teachers is also unbalanced, and, in many countries, challenging schools struggle to recruit more experienced teachers. In the majority of countries participating in the Teaching and Learning International Survey (TALIS), experienced teachers tend to teach in schools that have smaller proportions of students from socioeconomically disadvantaged backgrounds, with special needs, or whose first language is different from the language of instruction (OECD, 2014[7]; OECD, 2018[3]).

Moreover, some subject positions are harder to staff than others. The most reported shortages concern teachers in science, technology, engineering and mathematics (STEM)

subjects in the European Union (European Commission/EACEA/Eurydice, 2018[4]). Similarly, in the United States mathematics and science teachers have been the most in demand in recent years, followed by foreign language and special education teachers (Sutcher, Darling-Hammond and Carver-Thomas, 2016[8]; NCES, 2015[9]). Among countries taking part in the ITP study, Norway reported a mismatch between teacher's subject specialisation and the school's needs, especially in small schools.

Oversupply

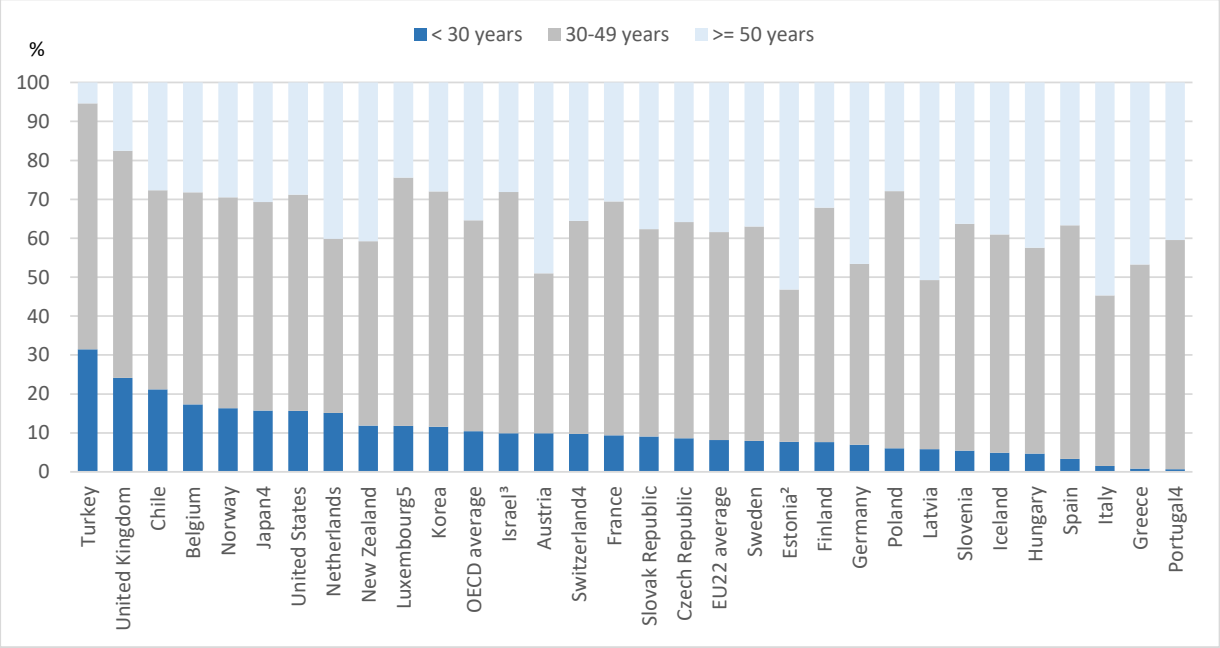
The unbalanced distribution of teachers leads not only to shortages but also to oversupply in certain geographical and subject areas (European Commission/EACEA/Eurydice, 2018[4]). In many countries, these two phenomena co-exist (e.g. Germany, Greece, Spain, Italy, Lithuania), while some countries, such as Poland, Portugal and Slovenia, need mostly to tackle the challenge of oversupply (European Commission/EACEA/Eurydice, 2018[4]). Oversupply can imply difficulty for newly qualified teachers in finding placement after graduation, which in turn can negatively affect the view of teaching as a career. An unbalanced distribution of teachers across school boards was reported in the Netherlands in the ITP review, where some school boards attract stronger teacher candidates by offering better practicum, induction, professional development and general career opportunities, while others, especially smaller school boards and/or individual schools may not be able to offer the same opportunities. This may partly be related to inequities across schools and the effects of a decentralised teacher recruitment process.

Demographic characteristics

The demographic characteristics of the teaching workforce are relevant to predict future supply and demand. Many countries across the OECD have an ageing teaching workforce. On average, 35% of lower secondary teachers are aged 50 or more. In the reviewed countries, this proportion is particularly high in the Netherlands (40%), whereas it is slightly lower than the OECD average in Japan (31%), Korea (28%) and the US (29%) (see Figure 3.2). The general demographic characteristics of a country, in particular, the changing size of populations at different levels of education, also influence future teacher demands.

Figure 3.2. Age distribution of teachers

Percentage of lower secondary teachers in public and private institutions by age group, based on head counts (2016)



Note:
2. Upper secondary includes programmes from lower secondary vocational and post-secondary non-tertiary education.
3. For Israel, private institutions are included for all levels except for pre-primary and upper secondary levels.
4. Upper secondary includes post-secondary non-tertiary education.
5. Upper secondary includes short-cycle tertiary.
Source: OECD/UIS/Eurostat (2018). See Source section for more information and Annex 3 for notes (http://dx.doi.org/10.1787/eag-2018-36-en).

Attrition

The rate of attrition within the profession is also high in education systems around the world. Teachers leaving the profession during the first five years have reached a proportion of close to 40% in many countries and jurisdictions including in Canada, Hong Kong, the United Kingdom and the United States. (Gallant and Riley, 2014[10]), and some report high rates from other countries (Köber, Risberg and Texmon, 2005[11]; Hong, 2010[12]). In the ITP review only the Netherlands reported national data on attrition, where the rate in the 5 first years of teaching is the highest in secondary vocational education (35%), followed by general secondary education (27%) and primary education (15%) (Brouwer et al., 2016[13]).

While most studies and policy papers emphasise the negative impact of teacher attrition (European Union, 2013[14]; OECD, 2005[15]), some also point to the scarcity and controversial nature of data (Paniagua and Sánchez-Martí, 2018[16]; Holme et al., 2017[17]). Paniagua and Sánchez-Martí (2018[16]) question the perceived magnitude and often narrow interpretations of teachers leaving the profession by illustrating the multifaceted nature of the phenomenon. For example, little attention is paid to second-career teachers who come in the profession, data is scarce on the number of teachers only

temporarily leaving the profession, and the reasons behind and impact of early career teachers' decision to leave the profession is also not yet well-understood (Paniagua and Sánchez-Martí, 2018[16]; Kelchtermans, 2017[18]). Moreover, if effective teachers are less likely to leave than less effective teachers, then high levels of teacher attrition may improve rather than decrease the overall quality of the teaching workforce (Guarino, Santibañez and Daley, 2006[19]), even though attrition is generally costly to education systems. To ensure a good balance of supply and demand, it would be crucial to better understand the attrition phenomenon, including having more solid and holistic data, and exploring the drivers of attrition.

Teacher diversity

In many OECD countries, the increasingly diverse student population does not match with a teacher workforce that is largely homogeneous (Nusche, 2009[20]). This is particularly important given the growing literature on the positive effect of same-race teachers on ethnic-minority students in terms of performance, role-modelling, motivation and the overall educational experience of not only ethnic minority students, but of low-income students of both sexes (Gershenson et al., 2017[21]).

Research suggest a wide range of barriers to the diversity of the teaching workforce at every stage of the teaching pathway, and thus a cumulative effect exists explaining the important underrepresentation of teachers from ethnic or migrant communities (Meierkord, Donlevy and Rajania, 2016[22]). In particular, barriers accessing ITE include:

- lower academic achievement and negative school experiences
- language barriers
- lack of financial resources
- lack of confidence to access the teaching careers
- lack of recognition of degrees obtained outside the host country.

For example, traditional certification methods can have undesirable effects on the diversity of the teaching profession. In the United States, for example, some theory-based assessments (e.g. PRAXIS) may unintentionally exclude teachers of colour, who may not have received the same educational opportunities as other candidates. Contexts of high competition, such as in Korea, or strict criteria to enter and complete ITE programmes, such as the exams introduced in primary ITE in the Netherlands, can work against the diversity of teacher profiles and lead to the exclusion of potential teacher candidates.

3.1.2. Making the teaching profession more attractive

Research has repeatedly shown that the quantity and the quality of teachers are strongly interconnected (OECD, 2005[23]). As mentioned above, policy responses to shortages include lowering qualification requirements, but also assigning teachers to teach in subject areas in which they are not fully qualified, increasing teaching hours or class sizes (OECD, 2005[23]). Such quick solutions however have inevitable implications on the quality of teaching and learning (OECD, 2005[23]).

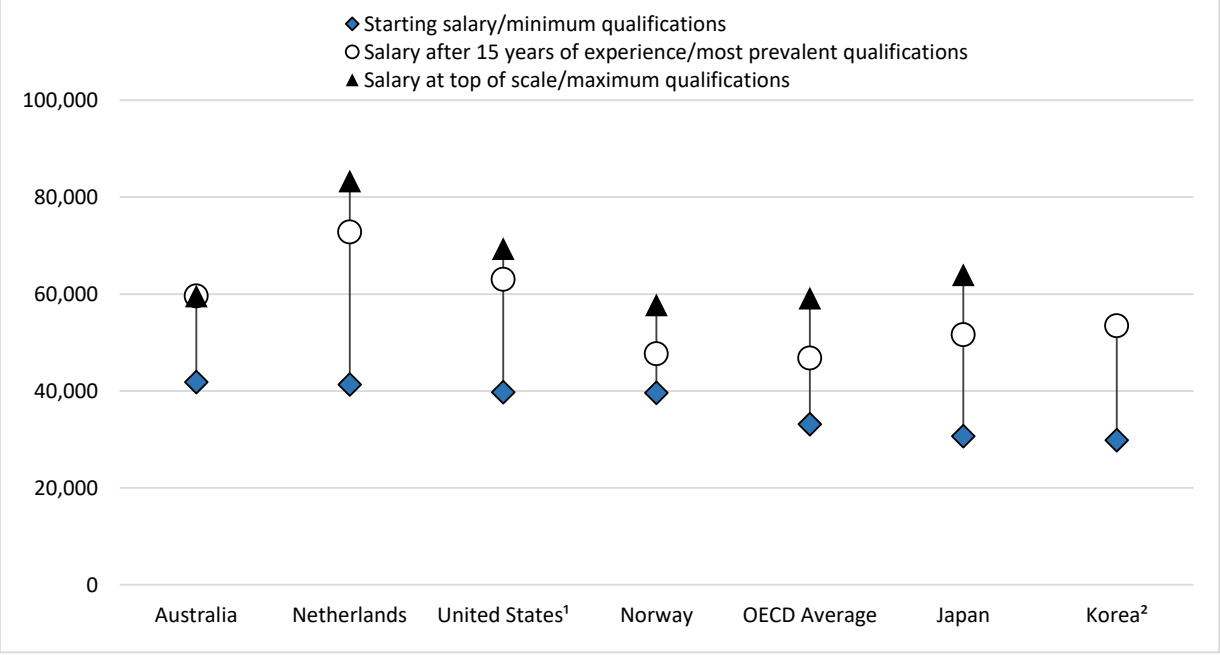
Ensuring the adequate number of qualified teachers across the schools system is inherently linked to the attractiveness of the profession. Competitive salaries, job security, holiday entitlements and opportunities for career progression certainly make a profession more attractive. Studies often show that teachers are highly motivated by the intrinsic benefits of teaching such as working with children, helping them develop and making a contribution to society, and suggest that extrinsic factors (such as job stability,

pay or working hours) are less important (OECD, 2018[3]; OECD, 2005[23]). However, studies that investigate graduates' career choices have also demonstrated that the relative salaries and social status of graduate occupations do play a role in their choices, suggesting that higher teachers' salaries and status might result in more graduates considering a teaching career (e.g. (OECD, 2018[3]; Dolton, 2006[24]).

Although teachers' salaries show an increasing trend since 2013 on average in OECD countries (OECD, 2018[25]), teaching is often still not a financially attractive profession. Teachers at the lower secondary level earn almost 10% less on average across the OECD than their tertiary-educated counterparts, and in some countries, the difference is 30% or even more (OECD, 2018[25]). Among countries in the ITP study, the differences are most marked in the United States (35%) and Norway (25%), whereas in Australia and the Netherlands teachers earn only slightly less (7% and 8% respectively) than other tertiary educated workers (OECD, 2018[25]). The salary scales between starting and maximum salaries are also relatively flat in a number of countries, which adds to the weak financial incentives to retain teachers as they progress in their career (OECD, 2018[25]). Salary scales are the flattest in Australia and Norway among countries participating in the ITP study (Figure 3.3). In Norway, a lack of widely available and fully developed career paths for teachers was identified as a potential detractor from the profession.

Figure 3.3. Lower secondary teachers' statutory salaries at different points in teachers' careers (2017)

Annual statutory salaries of teachers in public institutions, in equivalent USD converted using PPPs



Note:
1. Actual base salaries.
2. Salaries at top of scale and most prevalent qualifications, instead of maximum qualifications.
Source: OECD (2018[25]), Education at a Glance 2018: OECD Indicators, OECD Publishing, Paris.

It is nevertheless important to highlight that the evidence linking higher salaries to greater average quality or effectiveness of teachers is mixed. While some studies showed positive

relationships between teacher salaries and student achievement (Dolton and Marcenaro-Gutierrez, 2011[26]), others did not confirm this. For example, changes in teachers' statutory salaries were weakly related to learning trends in science based on PISA data (OECD, 2018[3]). It is therefore also crucial for policy makers to emphasise other aspects of job quality in order to promote teaching as a career (OECD, 2018[3]). Working conditions, such as workload or class size, as well as other qualitative aspects, such as autonomy and intellectual challenge, seem to play an even more important role, as some studies suggest (OECD, 2018[3]; Sahlberg, 2010[27]).

The attractiveness of the profession is also reflected in how teachers perceive their jobs and profession, the ease of entry into the profession and the rigour of initial teacher education programmes. Data from TALIS (OECD, 2014[7]) reveals that while most teachers are satisfied with their jobs (on average 91% in participating countries), in many countries, only a small proportion (on average 31%) feels that teaching is a valued profession. In most countries in the ITP study this proportion is close to the OECD average with 39% in Australia, 28% in Japan, 40% in the Netherlands, 31% in Norway and 34% in the United States (OECD, 2014[7]). On the other hand, teaching is perceived as a highly valued profession by two thirds of teachers in Korea (OECD, 2014[7]). Understanding the factors that attract people into teaching and motivate teachers to persist in the profession is essential to guide policy initiatives at the pre-service and in-service levels to reduce attrition and maintain a high-quality teaching workforce (see Box 3.1 for some of the factors identified in the ITP reviews).

Box 3.1. Attractiveness of the teaching profession as a key ITP challenge – examples from countries

High work load, increasing responsibilities and "invisible tasks"

The demands on both new and experienced teachers are ever growing in the face of new technologies, increased administrative tasks, new social challenges in schools (e.g. truancy, bullying, etc.) and parents' expectations. As a result, teachers and schools report having less teaching time due to more time spent on tasks not directly related to teaching. Such challenges were noted in Norway, Japan and Korea.

Waves of reforms

In some countries, such as Japan, there have been many reforms targeting teachers and their work in recent years. Fatigue from constant changes in teachers' work and the number of changes could be a threat to teachers' happiness.

Negative media coverage and public opinion

In some countries, such as Australia and Norway, media shows a negative image of the profession or focuses on continued critique of teacher education. This risks discouraging young people from going into teacher education and high quality teacher candidates from entering the profession.

Source: OECD Initial Teacher Preparation Study, Country SWOT Analyses, TeacherReady! platform www.oecdteacherready.org

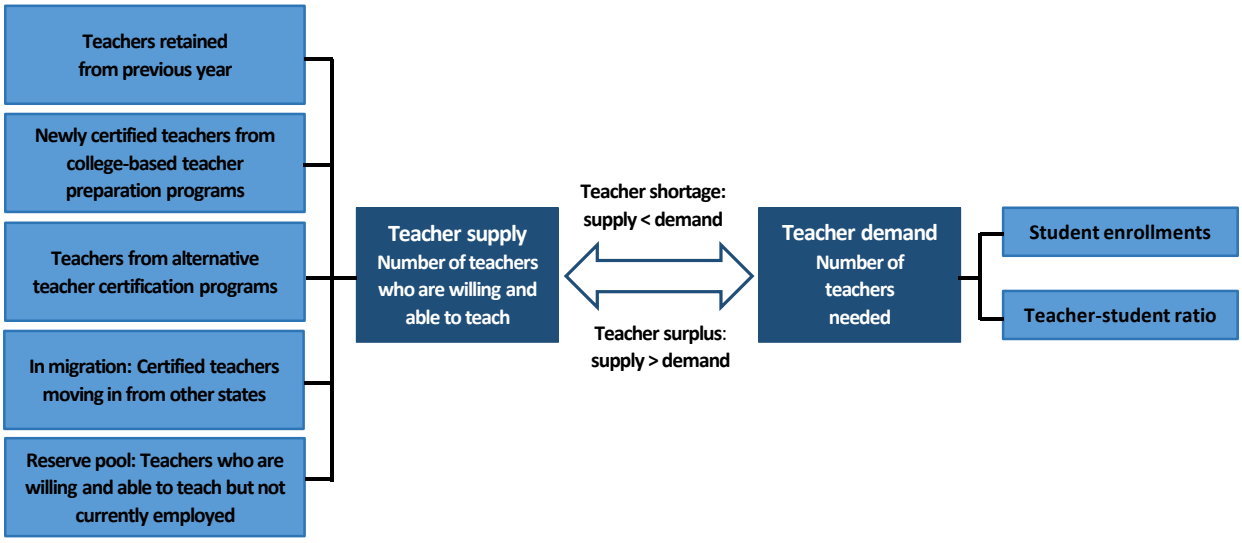
3.2. What strategies can address the challenge?

3.2.1. Using diversified longitudinal ITP data in actively forecasting workforce needs

As demonstrated above, forecasting workforce needs involve a number of factors. While identifying the relevant data sources is contingent on the country context, a methodological approach that takes account of the complexity of this issue and combines demographical trend data with data gathered from teacher education institutions, schools and national administration is needed to understand where interventions are needed. However, while more data may help candidates make informed choices, demand and quality might not be the only factors that influence programme choice if there are programmes of lower cost or in a more favourable location that lead to jobs. For example, the review in Korea identified some students who may enter ITE with the intention of using their degree as a pathway to other fields.

A recent review of literature by Lindsay and colleagues (2016[28]) analyses US data sources relating to a number of issues such as: teacher supply trends, shortage or surplus by certification areas, school type, schools area (rural or urban), perceived barriers to hiring effective teachers, factors influencing teacher education institutions' ability to prepare effective teachers, and expected public school enrolment trends (Lindsay et al., 2016[28]). The conceptual approach the authors propose compares aggregate estimates for teacher supply and demand components in the United States (Figure 3.4).

Figure 3.4. The components of teacher supply and demand



Source: Adapted from Lindsay et al. (2016[28]), *Strategies for Estimating Teacher Supply and Demand Using Student and Teacher Data*, Department of Education, Institute of Education Sciences, National Center for Education Evaluation.

Better understanding likely trends in enrolment into ITE, completion and certification is an important piece in managing supply and demand. However, if we want to understand what intervention is necessary in a certain context, ITP data should not be limited to basic indicators. In particular, it needs to extend to teacher candidates' profile to help diversify the profession, to teacher education institutions' perceptions and experience in recruiting,

developing and certifying candidates. Moreover, it should also take account of the continuum, and collect data from schools to understand their needs, attrition and so on.

Overall, the involvement of every level of the ITP system – national, regional, teacher education institutional, school – in forecasting workforce needs and steering supply and demand is key. Establishing longitudinal information systems (as discussed in Section 2.1.2 in Chapter 2) can also greatly contribute to a strategic and comprehensive collection and analysis of ITP data for managing supply and demand.

3.2.2. Raising the status of teaching and teacher education

While there are many factors contributing to the status of the teaching profession including remuneration, career paths and working conditions, ITP systems have a great potential to raising this status, in particular, through making the process of becoming a teacher attractive. This includes general attributes of professionalism such as self-governance with well-functioning professional organisations that establish and regulate standards of practice, code of conduct, certification, etc. (Guerriero and Deligiannidi, 2017[29]). Moreover, it also requires reflecting on how to make teacher education relevant for those who want to pursue a fulfilling professional career in teaching. Initial training, induction and learning growth can be strong determinants of the status of teaching (see Figure 3.5) and should thus be an inherent part of a systematic approach to raising this status.

Figure 3.5. Possible determinants of the status of the teaching profession

Source: Adapted from Guerriero and Deligiannidi (2017[29]), The teaching profession and its knowledge base, In: Guerriero, S. (2017) *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, pp. 27.

One main challenge in raising the status of teacher education comes from the absence of a robust and integrated professional knowledge base – or the lack of understanding in what it entails (Guerriero, 2017[30]). This gap makes practices to remain unarticulated, isolated and difficult to transfer (Schleicher, 2018[31]). As pointed out by Révai and Guerriero (2017[32]), existing teaching practices are based on tacit knowledge that is often difficult to make explicit and visible, and on more articulated forms of knowledge that however are not always rooted in evidence-based research. Building a solid knowledge base on teaching and learning in a systematic way would be a prerequisite for providing high quality teacher education. This in turn could raise the status of teacher education and contribute to attracting candidates in the profession.

While diversified ITP pathways, such as alternative certification, lateral entries, tailored routes for second-career teachers, can resolve supply-demand issues, they carry a huge risk of diminishing the value of teacher education (Zeichner, 2014[33]). Not only it is

strategic that countries implement formal regulations to safeguard the quality of graduates regardless of the path they have followed, but it is necessary to reflect on the impact that "emergency routes" to certification can have on the way teacher education is viewed among potential teacher candidates (Walsh and Jacobs, 2007[34]). Further, although experience matters in teaching, recent research has pointed to the need to consider "learning from experience" rather than "acquiring experience" as a dimension of teacher effectiveness. The focus should thus be on improving our knowledge about the conditions under which professional learning flourishes (OECD, 2018[3]; Paniagua and Sánchez-Martí, 2018[16]). The social perception that experience per se is what matters most can also underplay the key role of teacher competences and their professional knowledge.

An outstanding issue in teacher education is the capacity of teacher educators to provide teacher candidates with relevant knowledge. There is a need to conduct conceptually and methodologically more robust studies relating not only to the identity and status of teacher educators, but also to the pedagogy of teacher education (Davey, 2013[35]), such as the OECD CERI's Teacher Knowledge Survey. This study plans to collect data on teacher educators' knowledge base, motivational characteristics, as well as their opportunities to learn (Sonmark et al., 2017[36]). Competence standards, procedures and criteria for becoming a teacher educator need to be developed to strengthen the professionalisation of teacher educators.

3.2.3. Attracting, selecting and hiring "the right" candidates

While selective ITE entry policies can raise the status of teacher education, and consequently of teaching as a profession, there is still a need to understand which candidates are "the right" ones for teaching. Attracting high achieving candidates to teaching has been identified as a feature of high quality education systems by some international reports (Barber and Mourshed, 2007[37]; Auguste, Kihn and Miller, 2010[38]). However, actual evidence on the impact of previous academic achievement of teacher candidates on their later teaching competences is controversial (Harris and Sass, 2008[39]).

Besides knowledge of the subject content and of pedagogy, professional competences also include affective and motivational characteristics (see Figure 4.1. in Chapter 4) (Sonmark et al., 2017[36]; Guerriero, 2017[30]). An increasing number of studies show that the mastery of instruction is influenced by teachers' affective, motivational and self-regulatory characteristics (Lauermann, 2017[40]). In particular, teachers' enthusiasm for teaching has been identified as a predictor for student- and teacher-reported instructional quality, as well as student achievement and interest in mathematics (Kunter et al., 2013[41]). Some studies also suggest that personal responsibility, i.e. "an internal sense of obligation, commitment and duty" influences teaching practice (Lauermann, 2017[40]). Moreover, characteristics such as self-efficacy, their beliefs about their subject content and about teaching also matter for teaching practice and student learning (Lauermann, 2017[40]; Blömeke, 2017[42]). Affective and motivational competences therefore also need to be taken into account in selecting, developing, certifying and hiring candidates.

Despite the evidence on the multi-dimensional nature of professional competence, many countries and institutions base their entry and selection on a narrow set of criteria. The ITP study noted for example, that a strong emphasis on mathematics scores in entry requirements in Norway may have controversial impact on the suitability and quality of teacher candidates. There have also been concerns about the use of secondary school exam scores as an entry requirement in teacher education in Australia (TEMAG, 2014[6]). Building on stakeholder views, this report emphasises the need for more flexible and

comprehensive approaches to selection (TEMAG, 2014[6]). The most recent accreditation standards require ITE providers to apply selection criteria, which incorporate both academic and non-academic components (AITSL, 2015[43]). A promising example identified in the ITP review is the Teacher Capability Assessment Tool that was developed by the University of Melbourne and has been used by increasingly more institutions across Australia (see Box 3.2 and Table 3.1/1). A comprehensive assessment of competencies can also inform decisions about certifying and hiring teachers. Understanding candidates' motivational characteristics for example through interviews and portfolios can help finding the best fit for certain contexts.

Box 3.2. The Teacher Capability Assessment Tool

In 2012, the University of Melbourne developed the Teacher Capability Assessment Tool (TCAT) as an evidence-based tool for selecting and developing entrants into their postgraduate teacher education programmes. The tool assesses a range of cognitive and non-cognitive domains associated with the successful completion of ITE programmes. The TCAT is composed of two core components:

- informed self-selection (e.g. disposition, self-regulation, resilience in the face of challenge, communication, cultural sensitivity, self-awareness)
- cognitive and non-cognitive skill assessment (numerical, verbal and non-verbal reasoning)

These include measures of personal attributes and capabilities related to experience and readiness that are based on evidence relating to the factors associated with success in a teaching career.

In addition, the TCAT has optional components: a structured behavioural interview and teaching demonstration. These involve a trained panel of interviewers who assess candidates in key research-supported areas such as interpersonal skills and behaviour under pressure. The teaching demonstration component involves candidates preparing and presenting a short lesson to a panel of assessors.

Source: Teacher Ready!

While a more complex approach to defining entry, selection, certification and hiring criteria is desirable, there is still a need to build strong evidence on the impact of different characteristics on teaching quality over time. Therefore, recognising the collective benefit of graduates' successful transition into the workforce and the importance of early and continuous professional development has a key role in developing candidates to become the right teachers in the right place (Paniagua and Sánchez-Martí, 2018[16]).

3.3. How can the different actors apply these strategies?

3.3.1. What can policy makers do?

Facilitating the collection, sharing and use of comprehensive ITP data to inform selection and hiring decisions

Forecasting requires shared responsibilities and collaboration of teacher education institutions, schools and regional or local administration in collecting and using data. For example, tracking students during and after ITE can provide useful data on issues such as

teacher attrition and retention. Decision makers (including policy makers, local school boards, school leaders, etc.) can make more informed decisions if such data are easy to access and analyse. Therefore, policy makers should invest resources in developing longitudinal information systems that facilitate the collection and use of comprehensive data across institutions and over time.

Statistics Norway (LÆRERMOD) is an example for forecasting supply and demand for different types of teachers. This institute provides estimates that can be used to adjust teacher education to trends in the number of future users of educational services (Toril, Lund and Simonsen, 2016[44]). CentERdata in the Netherlands makes annual labour market estimates for the Ministry on teacher supply and demand over a period of 10 to 15 years. This institute uses a microsimulation model called Mirror (Microsimulation Calculation Model Regional Education Estimates), which is able to make statements at every aggregate level – not only on the geographic level, but also at the administrative level (CentERdata, n.d.[45]).

In Australia, work is underway on the Australian Teacher Workforce Data (ATWD) (AITSL, 2017[46]) collection which will link ITE data and teacher workforce data from across the country to provide a national picture of the teacher workforce, from those entering ITE through to retirement, to assist in future workforce planning and policy development.

Policy makers can also facilitate collaboration among institutions to agree on common data collection standards, and strategies for sharing and using data. For example, giving incentives to local administration (e.g. school boards or districts) to work with ITE providers and schools could help ensure that teachers are trained and selected to best meet local needs. This is particularly important in areas where distance between partners create challenges (i.e. in rural areas).

Providing multiple paths and support to enter teaching while maintaining quality standards

Providing multiple paths, including alternative routes, to teaching can create more flexibility in entering the profession, and thus provide supply of teachers in shortage areas. In the United States for example, candidates can enter the teaching profession through traditional routes provided by higher education institutions and alternative entry points. While such opportunities provide flexible and specialised training options for people to enter the profession, policy makers need to ensure that these programmes and routes also satisfy quality standards of teacher education.

Providing scholarships into teacher education or targeted programmes to attract candidates in specific areas can facilitate supply when there is a high demand of teachers. For example, some Australian states make special efforts to attract experienced STEM workers into teaching (Table 2.3/2), while other states have introduced incentives for teacher candidates to teach in remote areas (see also Box 3.3 and Table 2.3/3).

In order to attract "hesitant" candidates into teacher education, policy makers can encourage universities and other ITE providers to offer joint programmes. The Dutch Ministry of Education, for example, has been encouraging universities and providers of primary level ITE (Universities of Applied Sciences) to co-operate and deliver joint Bachelor of Arts (BA) primary ITE programmes, which award the student a BA from both institutions (Table 2.3/8).

Box 3.3. Attracting candidates to teaching in high need areas in Australia

As many other countries, Australia has difficulties both attracting science, technology, engineering and mathematics (STEM) graduates into teaching and to attract and retain teachers in regional, rural and remote areas. In order to address these challenges, state and federal governments have implemented a diverse range of tailored initiatives.

The Teach for Australia programme, supported by the Australian Government, aims to fast track high-calibre non-teaching university graduates into disadvantaged secondary schools by providing an employment-based pathway into teaching.

In Queensland, STEAM (STEM and Arts) Teacher Education Centre of Excellence (STEAM TECE), provides with alternative routes to career changers with STEAM degrees in order to obtain the Master of Secondary Teaching. The rationale of the programme is to shorten the training of candidates but at the same time provide high quality trained mentors and a strong practicum and continuous contact with schools that partner with the programme. Due to the high demand for places, the programme does not currently offer financial compensation for students.

In the Northern Territory, Queensland, and Western Australia, state and territory governments offer a range of initiatives aiming at securing the quantity and quality of teachers in remote schools. These include the development of partnerships with universities outside these areas to offer practicums, substantial financial support, scholarships, while building teachers' capacities (Table 2.3/3).

Introducing targeted incentives to support the supply of qualified teachers to meet specific needs

Interventions are often required in terms of both the preparation and employment of teachers to address specific needs. This can include scholarships for teachers with specific attributes or commitment to work in particular areas of need. Special preparation schemes should be incorporated in ITP programmes for teaching particular students to support the smooth transition of teacher graduates into employment in high need areas. It is equally essential to recognise the first few years of the teaching career as a crucial part of the learning process and, accordingly, assign early career teachers a special learning status with corresponding support mechanisms (Paniagua and Sánchez-Martí, 2018[16]).

Such interventions can help ensure greater supply of appropriately skilled teachers to teach in rural or remote areas, areas of shortage in terms of curriculum expertise, lower socio-economic communities and in schools serving minority and indigenous student populations. For example, financial incentives, such as scholarships and subsidies, are provided in the Netherlands for students in shortage subjects such as languages and the hard sciences to enter teacher education (Table 2.3/9).

Including high quality teacher education in a comprehensive strategy to increase the attractiveness of teaching

The ITP study identified the need for a coherent national strategy to increase the attractiveness of teaching. This should include at a minimum two key pillars: promoting teaching as a career and promoting teaching as a high status profession. The former involves salary structures, career progression and working conditions, while the latter

includes increasing the level of professional autonomy and responsibility, providing opportunities for personal growth, as well as promoting high quality teacher education. All of these factors contribute significantly to attracting and retaining effective teachers (Podolsky et al., 2016[47]).

Policy makers should consider teacher education as a key lever in promoting teaching as a profession. For example, Norway raised general criteria for becoming a teacher by introducing 5-year integrated Master's programmes (Table 2.3/12). Such high-level degree programmes can enhance the status of the profession in the long run, although they may lead to shortages in the short term. Guaranteeing professional autonomy and empowering the teaching and teacher educator professions to take charge of their knowledge base, is also a way of promoting the profession. Examples for this are the Netherlands and Norway, where defining quality standards and professional knowledge is the responsibility of the profession.

Policy makers should accompany such promotion with a clear communication strategy to deepen the discourse around teaching in the media and public. This can change the often negative image of teaching reflected in media and public opinion. Examples for such media campaigns include Best Job in the World and Teach to Lead campaigns in the United States.

3.3.2. What can teacher education institutions do?

Defining and setting quality criteria for ITP programmes across institutions

Teacher education institutions can initiate dialogue with schools and local administration (school boards, districts) to agree on quality levers at completion of initial teacher preparation (including induction period). These methods could complement or replace current entry criteria into initial teacher preparation – and could better inform teacher recruitment and selection. In Japan, there has been a development of quality assessments and filters to increase the competitive selection of candidates to ITE programmes (Table 2.3/4), while the Australian Federal Government has implemented new national selection requirements to ensure teacher candidates meet the adequate levels of academic and non-academic criteria (Table 2.3/1).

Quality criteria should also extend to research and teaching in ITE. Conducting high-quality research on teaching and learning and involving teacher candidates in research projects can contribute to attracting candidates into teacher education. In Wales, there is currently a strong emphasis on changing the research culture in teacher education institutions and develop a more coherent research agenda (Table 2.3/13). In Korea, the Ewha Womans University has a model of ITE focusing on creativity and critical thinking to foster teacher candidates' capacity to be prepared for the changing realities and needs of schools (Table 2.3/6). This model is based on and highlights the need to develop high standard and interdisciplinary education research.

Creating and offering joint ITE programmes is another form of cooperation between institutions that can facilitate shared quality criteria and attract candidates at the same time. Such an initiative was identified in the Netherlands (Table 2.3/8, see also above).

Partnerships between teacher education institutions and schools in developing ITP programmes can also contribute to common standards and higher quality ITP. In the Netherlands, there are examples for partnerships between school boards and ITE

providers to develop ITE and professional development programmes together and drive improvement across their schools (see Box 4.3. in Chapter 4 and Table 2.3/10).

Using and sharing data on teacher candidates to facilitate decisions about appointing and hiring candidates

Collecting comprehensive data on entry and completion, the profile of teacher candidates (e.g. second career teachers), their motivational characteristics and so on can contribute to better managing supply and demand.

In general, teacher education institutions can initiate and facilitate closer collaboration with schools and districts to better understand local teacher supply-demand issues and development needs. For example, partnering with schools can facilitate the collection and use of data that extend to graduates after employment. ITE providers could also share candidate information with schools and districts (e.g. share candidate strengths, areas for development, interest and motivation before practical training and during selection/recruitment). This can facilitate appointing the right candidate in the right place and also help to create a development continuum from preparation to induction. This is best illustrated in the way diverse Australian initiatives seek to develop particular preparation paths to meet the particular requirements of schools (see Box 3.3 and Table 2.3/2,3). In Korea, employment examinations are both an important driver of quality of teacher candidates and meet the local needs of schools (see Box 3.4 and Table 2.3/7).

Box 3.4. Managing the quality of ITE programmes and teacher candidates using quality assessments

As participation in secondary education has become almost universal in Korea and low birth rates are causing the number of secondary school students to decline, the country is experiencing a considerable oversupply of graduates, in particular at the secondary level. Two different measures have been introduced that have turned a perceived challenge – the oversupply of ITE programmes and teacher candidates – into an opportunity to increase the quality of the ITP system.

First, the introduction of a comprehensive and robust employment exam as the final stage of ITP has helped schools to hire the best candidates, while introducing a fair method of assessment. The exam is designed by the Korean Institute for Curriculum and Evaluation (KICE) but is delivered by provincial education offices, who are able to customise it to best suit their needs. Second, the evaluation of ITE programmes established the criteria to provide ITE institutions with information for improving the quality of their programmes and reducing progressively the number of ITE places for secondary teaching. This evaluation is designed by the Korean Educational Development Institute (KEDI) and then conducted by panels of teacher educators (Table 2.3/7).

Acknowledging teacher educators' unique role and supporting them

Teacher education institutions need to acknowledge and support teacher educators in their diverse roles. This can include providing professional development opportunities, evaluating and promoting teacher educators not only based on their scientific work, but also based on their teaching. Providing incentives for them to conduct research relevant for teaching teachers, reflect on and improve their practice collectively can contribute to building a coherent knowledge base for teacher educators.

Although there is still no formal training for teacher educators, there is a growing awareness of the status and role of teacher educators in both Norway and the Netherlands (Toril, Lund and Simonsen, 2016, p. 39[44]; Brouwer et al., 2016[13]). An example for this is the Dutch professional standards for teacher educators developed by the Dutch Professional Association for Teacher Educators (VELON) that include "knowledge bases" for teacher educators to improve the quality of ITE programmes in the Netherlands (Table 2.3/11). In Norway, unless they have a proven record of pedagogical competences, new teacher educators are required to complete a 100-hour course in university pedagogy (Toril, Lund and Simonsen, 2016, p. 39[44]).

3.3.3. What can schools and the profession do?

Taking charge of teachers' knowledge base

While the overall policy context is crucial for raising the status of teaching, in order for it to become a full profession, it is the profession itself that needs to take charge of governing itself (Schleicher, 2018[48]; Howsam, Corrigan and Denemark, 1985[49]). Governing their own knowledge base is a key element of this. For example, schools can collaboratively co-conduct or participate in experimental and design research to identify what works in which context. The Japanese Lesson Study is a classic example for teachers engaging in research-based enquiry about practice (see Box 3.5 and Table 2.3/5). Schools can also develop and apply mechanisms that allow integrating new evidence into the professional practice such as disseminating results, systematically sharing individual and organisational knowledge, and so on (Révai and Guerriero, 2017[32]).

Profession-regulated registration and standards also contribute to the status of teaching. Many countries set professional standards for teachers, but it is not always the profession itself that is responsible for developing and revising these (Révai, 2018[50]). Examples for high professional involvement in developing teaching standards include Australia, New Zealand, Scotland and other countries (Révai, 2018[50]; OECD, 2013[51]).

Box 3.5. Research-based enquiry about practice in ITE in Japan

This form of collective enquiry process encompasses all phases of the ITP system in Japan and continues during in-service teaching. The process is called "lesson study" and involves a group of teachers working together to research, plan, teach, observe, and reflect on lessons. This approach helps teachers develop research skills needed to learn from the analysis of their own practices. Since this practice is well-established in most schools in Japan, the learning environments support teachers to carry out powerful lesson study work. Importantly, the 'research lessons' – i.e. the observed lessons – are acknowledged not as an end in themselves but as a fundamental way to build a contextual and collective view of education and the teaching profession. Outside Japan, "lesson study" approaches have spread over different countries on projects with in-service teachers – such as Norway, Ireland, United Kingdom, Hong Kong or the United States - but it still limited in ITE contexts Table 2.3/5).

Identifying specific needs and getting involved in the selection process

Schools forecasting their own teacher needs to the extent possible, collecting data on entry and attrition, as well as qualitative data such as exit interviews to better understand why some teachers leave the profession can foster the effective management of supply and demand.

In countries with decentralised systems, schools can participate in the selection of teachers, or are entirely responsible for selecting and hiring teachers such as Norway or the Netherlands. In the Netherlands, practical training of teachers include mandatory internships. This can be an opportunity to "try before they buy", i.e. allowing schools to recruit teachers with the right "fit". In Norway, the opportunity for those who are completing their studies or are early in their careers to enter the profession as a teaching assistant has similar advantages. Former assistants are sometimes hired after a successful practicum.

Table 3.1. Practices to ensure a balanced teacher workforce

Reference number	Title of practice	Country
1	Improving the quality of the selection process of teacher candidates in Australia	Australia
2	Recruiting highly qualified mature STEAM graduates to teaching in Australia	Australia
3	Attracting teachers to schools in rural and remote areas in Australia	Australia
4	Hiring the best teachers: The role of the teachers' Employment Examination in Japan	Japan
5	The use of lesson study to develop teachers in Japan	Japan
6	Transforming pedagogy in initial teacher education: Strategic support for innovation at Ewha Womans University in Korea	Korea
7	Managing the oversupply of teachers using quality assessments	Korea
8	Increasing the quality of entrants to primary teacher education in the Netherlands	The Netherlands
9	Employment-based routes into senior secondary vocational education in the Netherlands	The Netherlands
10	Schools and teacher education institutions co-creating ITE programmes in the Netherlands	The Netherlands
11	Industry-developed Professional Standards for Teacher Educators in the Netherlands	The Netherlands
12	Introducing a five-year master's degree for all teachers in Norway	Norway
13	Towards a research-informed, evidence-based reform agenda in initial teacher education in Wales	Wales (United Kingdom)

Note: Hyperlinks point to the description of Promising Practices identified in the ITP reviews accessible on the Teacher Ready! platform.

References

AITSL (2017), *Australian Teacher Workforce Data*, https://www.aitsl.edu.au/research/australian-teacher-workforce-data-strategy (accessed on 6 February 2019). [46]

AITSL (2015), *Accreditation of Initial Teacher Education Programs: Standards and Procedures*, https://www.aitsl.edu.au/docs/default-source/initial-teacher-education-resources/accreditation-of-ite-programs-in-australia.pdf (accessed on 30 December 2017). [43]

Auguste, B., P. Kihn and M. Miller (2010), *Closing the Talent Gap: Attracting and Retaining Top-third Graduates to Careers in Teaching: An International and Market Research-based Perspective*, McKinsey&Company, https://www.mckinsey.com/~/media/mckinsey/industries/social%20sector/our%20insights/closing%20the%20teaching%20talent%20gap/closing-the-teaching-talent-gap.ashx (accessed on 8 February 2019). [38]

Barber, M. and M. Mourshed (2007), *How the World's Best-Performing Schools Systems Come out on Top?*, McKinsey&Company, https://www.mckinsey.com/~/media/mckinsey/industries/social%20sector/our%20insights/how%20the%20worlds%20best%20performing%20school%20systems%20come%20out%20on%20top/how_the_world_s_best-performing_school_systems_come_out_on_top.ashx (accessed on 5 March 2018). [37]

BERA, B. (2014), *Research and the teaching profession: Building the capacity for a self-improving education system. Final Report of the BERA-RSA Inquiry into the Role of Research in Teacher Education*, British Education Research Association, https://www.bera.ac.uk/wp-content/uploads/2013/12/BERA-RSA-Research-Teaching-Profession-FULL-REPORT-for-web.pdf. [52]

Blömeke, S. (2017), "Modelling teachers' professional competence as a multi-dimensional construct", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-7-en. [42]

Boyd, D. et al. (2009), "Teacher Preparation and Student Achievement", *Educational Evaluation and Policy Analysis*, Vol. 31/4, pp. 416-440, http://dx.doi.org/10.3102/0162373709353129. [64]

Brouwer, P. et al. (2016), *Country Background Report, OECD Initial Teacher Preparation Study. The Netherlands*, ecbo. [13]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [76]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [53]

Canrinus, E. et al. (2017), "Coherent teacher education programmes: Taking a student perspective", *Journal of Curriculum Studies*, Vol. 49/3, pp. 313-333. [89]

CCSSO (2017), *Transforming Educator Preparation: Lessons Learned from Leading States*, Council of Chief State School Officers, http://www.ccsso.org. (accessed on 5 February 2019). [86]

CentERdata (n.d.), *Education Labor Market Estimates*, https://www.centerdata.nl/en/projects-by-centerdata/education-labor-market-estimates (accessed on 19 December 2018). [45]

Clinton, J., R. Aston and J. Quach (2018), *Promoting evidence uptake in schools: A review of the key features of research and evidence institutions*, University of Melbourne, http://dx.doi.org/10.4225/49/5aa61c6c75a9e. [69]

Cochran-Smith, M. and A. Villegas (2015), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20. [59]

Cochran-Smith, M. et al. (2015), "Critiquing teacher preparation research: An overview of the field, part II", *Journal of Teacher Education*, Vol. 66/2, pp. 109-121, https://doi.org/10.1177/0022487114558268. [57]

Cochran-Smith, M. and K. Zeichner (2005), *Studying Teacher Education: The report of the AERA Panel on Research and Teacher Education*, American Educational Research Association, published by Lawrence Erlbaum Associates, https://books.google.fr/books?hl=en&lr=&id=hbiLAgAAQBAJ&oi=fnd&pg=PP1&dq=Studying+Teacher+Education:+The+Report+of+the+AERA+Panel+on+Research+and+Teacher+Education.+Lawrence+Erlbaum+Associates.+&ots=kvcbq8M6DT&sig=hrAHfWD_o5TPEUKJAicby2UxLwE (accessed on 1 October 2018). [56]

Cordingley, P. (2015), "The contribution of research to teachers' professional learning and development", *Oxford Review of Education*, Vol. 41/2, pp. 234-252, http://dx.doi.org/10.1080/03054985.2015.1020105. [73]

Cordingley, P. and M. Bell (2012), *Understanding What Enables High Quality Professional Learning*, CUREE and Pearson School Improvement, http://www.curee.co.uk (accessed on 18 February 2018). [74]

Darling-Hammond, L. and A. Lieberman (2012), *Teacher Education Around the World : Changing Policies and Practices*, Routledge, Abingdon, https://www.routledge.com/Teacher-Education-Around-the-World-Changing-Policies-and-Practices/Darling-Hammond-LIEBERMAN/p/book/9780415577014 (accessed on 4 October 2018). [61]

Davey, R. (2013), *The Professional Identity of Teacher Educators: Career on the Cusp?*, Routledge, London and New York. [35]

Davies, H. (2007), "Academic advice to practitioners—the role and use of research-based evidence", *Public Money and Management*, Vol. 27/4, pp. 232-235. [68]

Deeble, M. and T. Vaughan (2018), "An evidence broker for Australian schools", *Centre for Strategic Education*, Vol. 150. [67]

Dolton, P. (2006), "Chapter 19 Teacher Supply", in *Handbook of the Economics of Education*, Elsevier, http://dx.doi.org/10.1016/s1574-0692(06)02019-8. [24]

Dolton, P. and O. Marcenaro-Gutierrez (2011), "If you pay peanuts do you get monkeys? A cross-country analysis of teacher pay and pupil performance", *Economic Policy*, Vol. 26/65, pp. 5-55, http://dx.doi.org/10.1111/j.1468-0327.2010.00257.x. [26]

du Plooy, L. et al. (2016), "Searching for research results to inform the design of an initial professional teacher education programme for the foundation phase: A systematic review", *South African Journal of Childhood Education*, Vol. 6/1, pp. 1-8, http://dx.doi.org/10.4102/sajce.v6i1.285. [55]

European Commission/EACEA/Eurydice (2018), *Teaching Careers in Europe Access, Progression and Support*, Publications Office of the European Union, Eurydice Report. Luxembourg, https://eacea.ec.europa.eu/national-policies/eurydice/content/teaching-careers-europe-access-progression-and-support_en. [4]

European Commission/EACEA/Eurydice, E. (2017), *Support Mechanisms for Evidence-based PolicyMaking in Education (Eurydice Report)*, Publications Office of the European Union. [77]

European Union (2013), *The Attractiveness of the Teaching Profession in Europe*, European Union, Luxembourg, http://dx.doi.org/10.2766/40827. [14]

Gallant, A. and P. Riley (2014), "Early career teacher attrition: new thoughts on an intractable problem", *Teacher Development*, Vol. 18/4, pp. 562-580, http://dx.doi.org/10.1080/13664530.2014.945129. [10]

Gansle, K., G. Noell and J. Burns (2012), "Do Student Achievement Outcomes Differ Across Teacher Preparation Programs? An Analysis of Teacher Education in Louisiana", *Journal of Teacher Education*, Vol. 63/5, pp. 304-317, http://dx.doi.org/10.1177/0022487112439894. [65]

Gershenson, S. et al. (2017), *Discussion PaPer series The Long-Run Impacts of Same-Race Teachers*, http://www.iza.org (accessed on 17 December 2018). [21]

González-Sancho, C. and S. Vincent-Lancrin (2016), "Transforming education by using a new generation of information systems", *Policy Futures in Education*, Vol. 14/6, pp. 741-758, http://dx.doi.org/10.1177/1478210316649287. [71]

Guarino, C., L. Santibañez and G. Daley (2006), "Teacher recruitment and retention: A review of the recent empirical literature", *Review of Educational Research*, Vol. 76/2, pp. 173-208, http://dx.doi.org/10.3102/00346543076002173. [19]

Guerriero, S. (ed.) (2017), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-en. [30]

Guerriero, S. and K. Deligiannidi (2017), "The teaching profession and its knowledge base", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-3-en. [29]

Harris, D. and T. Sass (2008), *Teacher Training, Teacher Quality and Student Achievement*, National Center for Analysis of Longitudinal Data in Education Research, https://caldercenter.org/sites/default/files/1001059_Teacher_Training.pdf (accessed on 19 December 2018). [39]

Holme, J. et al. (2017), "Rethinking Teacher Turnover: Longitudinal Measures of Instability in Schools", *Educational Researcher*, Vol. 47/1, pp. 62-75, http://dx.doi.org/10.3102/0013189x17735813. [17]

Hong, J. (2010), "Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession", *Teaching and Teacher Education*, Vol. 26/8, pp. 1530-1543, http://dx.doi.org/10.1016/J.TATE.2010.06.003. [12]

Howsam, R., D. Corrigan and G. Denemark (1985), *Educating a Profession : Report of the Bicentennial Commission on Education for the Profession of Teaching of the American Association of Colleges for Teacher Education - Reprint with postscript.*, American Association of Colleges for Teacher Education, Washington, DC, https://eric.ed.gov/?id=ED270430 (accessed on 4 January 2018). [49]

Kelchtermans, G. (2017), "'Should I stay or should I go?': unpacking teacher attrition/retention as an educational issue", *Teachers and Teaching*, Vol. 23/8, pp. 961-977, http://dx.doi.org/10.1080/13540602.2017.1379793. [18]

Köber, T., T. Risberg and I. Texmon (2005), *Hvor jobber førskolelaerere og laerere?*, https://www.ssb.no/a/publikasjoner/pdf/sa74/kap-11.pdf (accessed on 11 October 2018). [11]

Koedel, C. et al. (2015), "Teacher Preparation Programs and Teacher Quality: Are There Real Differences Across Programs", *Education Finance and Policy*, Vol. 10/4, pp. 508-534, http://dx.doi.org/10.1162/edfp_a_00172. [66]

Kunter, M. et al. (2013), "Professional competence of teachers: Effects on instructional quality and student development.", *Journal of Educational Psychology*, Vol. 105/3, pp. 805-820, http://dx.doi.org/10.1037/a0032583. [41]

Lauermann, F. (2017), "Teacher motivation, responsibility, pedagogical knowledge and professionalism: a new era for research", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-10-en. [40]

Lindsay, J. et al. (2016), *Strategies for Estimating Teacher Supply and Demand Using Student and Teacher Data*, Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest, http://ies.ed.gov/ ncee/edlabs (accessed on 3 December 2018). [28]

Louisiana Board of Regents (n.d.), *Teacher Preparation Data Dashboards & Fact Book*, https://regents.la.gov/divisions/planning-research-and-academic-affairs/academic-affairs/teacher-education-initiatives/teacher-preparation-data-dashboards-fact-book/ (accessed on 5 February 2019). [85]

MA DESE, M. (2016), *Educator Preparation: Program Approval Criteria List*, http://www.doe.mass.edu/edprep/evaltool/2017CriteriaList.pdf. [82]

MA DESE, M. (2016), *Program Approval Guidelines*, http://www.doe.mass.edu/edprep/ProgramApproval.pdf. [81]

Mandinach, E. and E. Gummer (eds.) (2018), *Building Capacity and Commitment for Data Use in Teacher Education Programs*, Routledge. [80]

Meierkord, A., V. Donlevy and A. Rajania (2016), *Study on the diversity within the teaching profession with particular focus on migrant and/or minority background - Publications Office of the EU*, European Commission, http://dx.doi.org/10.2766/873440. [22]

NCES (2015), *Teaching Vacancies and Difficult-to-Staff Teaching Positions in Public Schools*, National Center for Education Statistics, https://nces.ed.gov/pubs2015/2015065.pdf (accessed on 24 September 2018). [9]

Nusche, D. (2009), "What Works in Migrant Education?: A Review of Evidence and Policy Options", *OECD Education Working Papers*, No. 22, OECD Publishing, Paris, https://dx.doi.org/10.1787/227131784531. [20]

Nusche, D. et al. (2014), *OECD Reviews of Evaluation and Assessment in Education: Netherlands 2014*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264211940-en. [88]

OECD (2018), *Education at a Glance 2018: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2018-en. [25]

OECD (2018), *Effective Teacher Policies: Insights from PISA*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264301603-en. [3]

OECD (2018), *Innovation Strategy for Education and Training*, http://www.oecd.org/education/ceri/innovationstrategyforeducationandtraining.htm (accessed on 5 December 2018). [70]

OECD (2018), *School Resources Review (forthcoming report on human resources)*, OECD Publishing, http://www.oecd.org/education/school-resources-review/ (accessed on 19 December 2018). [1]

OECD (2016), *PISA 2015 Results (Volume I): Excellence and Equity in Education*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264266490-en. [5]

OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264267510-en. [2]

OECD (2014), *TALIS 2013 Results: An International Perspective on Teaching and Learning*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264196261-en. [7]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [51]

OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, OECD Reviews of Tertiary Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264046535-en. [79]

OECD (2007), *Evidence in Education: Linking Research and Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264033672-en. [54]

OECD (2005), *Teachers Matter - Attracting, Developing and Retaining Effective Teachers*, OECD Publishing, Paris, http://new.sourceoecd.org/education/9264018026 (accessed on 14 March 2018). [23]

OECD (2005), *Teachers Matter: Attracting, Developing and Retaining Effective Teachers*, Education and Training Policy, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264018044-en. [15]

Paniagua, A. and A. Sánchez-Martí (2018), "Early Career Teachers: Pioneers Triggering Innovation or Compliant Professionals?", *OECD Education Working Papers*, No. 190, OECD Publishing, Paris, https://dx.doi.org/10.1787/4a7043f9-en. [16]

Peck, C., C. Gallucci and T. Sloan (2010), "Negotiating implementation of high-stakes performance assessment policies in teacher education: from compliance to inquiry", *Journal of Teacher Education*, Vol. 61/5, pp. 451-463, http://dx.doi.org/10.1177/0022487109354520. [58]

Podolsky, A. et al. (2016), *Solving the Teacher Shortage How to Attract and Retain Excellent Educators*, Learning Policy Institute, Palo Alto, CA, https://learningpolicyinstitute.org/sites/default/files/product-files/Solving_Teacher_Shortage_Attract_Retain_Educators_REPORT.pdf (accessed on 6 December 2018). [47]

Révai, N. (2018), "What difference do standards make to educating teachers?: A review with case studies on Australia, Estonia and Singapore", *OECD Education Working Papers*, No. 174, OECD Publishing, Paris, https://dx.doi.org/10.1787/f1cb24d5-en. [50]

Révai, N. and S. Guerriero (2017), "Knowledge dynamics in the teaching profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-4-en. [32]

Rhode Island Department of Education (n.d.), *Rhode Island Educator Preparation Index*, http://www3.ride.ri.gov/RIEdPrepIndex/ (accessed on 5 February 2019). [84]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [90]

Sahlberg, P. (2010), *The Secret to Finland's Success: Educating Teachers | Stanford Center for Opportunity Policy in Education*, Stanford Center for Opportunity Policy in Education Research Brief, https://edpolicy.stanford.edu/library/publications/290 (accessed on 12 November 2018). [27]

Schleicher, A. (2018), *Valuing our Teachers and Raising their Status: How Communities Can Help*, International Summit on the Teaching Profession, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264292697-en. [48]

Schleicher, A. (2018), *World Class: How to Build a 21st-Century School System*, Strong Performers and Successful Reformers in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264300002-en. [31]

Sonmark, K. et al. (2017), "Understanding teachers' pedagogical knowledge: report on an international pilot study", *OECD Education Working Papers*, No. 159, OECD Publishing, Paris, https://dx.doi.org/10.1787/43332ebd-en. [36]

Sutcher, L., L. Darling-Hammond and D. Carver-Thomas (2016), *A Coming Crisis in Teaching? Teacher Supply, Demand, and Shortages in the U.S.*, Learning Policy Institute, https://learningpolicyinstitute.org/product/coming-crisis-teaching-brief. [8]

Tatto, M. (2015), "The role of research in the policy and practice of quality teacher education: an international review", *Oxford Review of Education*, Vol. 41/2, pp. 171-201, http://dx.doi.org/10.1080/03054985.2015.1017405. [72]

Tatto, M. et al. (2016), "The emergence of high-stakes accountability policies in teacher preparation: an examination of the U.S. Department of Education's proposed regulations", *Education Policy Analysis Archives*, Vol. 24/0, p. 21, http://dx.doi.org/10.14507/epaa.24.2322. [63]

TEMAG (2014), *Action Now: Classroom Ready Teachers*, Teacher Education Ministerial Advisory Group, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_print.pdf. [6]

TEMAG, T. (2014), *Action Now: Classroom Ready Teachers (Teacher Education Ministerial Advisory Group Final Report)*, Australian Department of Education, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf. [78]

Timperley, H. et al. (2007), *Teacher Professional Learning and Development Best Evidence Synthesis Iteration [BES]*, New Zealand: Ministry of Education, Wellington, http://educationcounts.edcentre.govt.nz/goto/BES (accessed on 11 October 2018). [75]

Toon, D., B. Jensen and S. Cooper (2017), *Teaching Our Teachers: a Better Way - Continuous Improvement in Teacher Preparation*, Learning First, Melbourne, http://www.learningfirst.com. (accessed on 4 October 2018). [62]

Toril, F., A. Lund and B. Simonsen (2016), *Country Background Report Norway; OECD TALIS initial teacher preparation preparation study.*. [44]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [87]

Walsh, K. and S. Jacobs (2007), *Alternative Certification Isn't Alternative*, Thomas B. Fordham Institute and National Council on Teacher Quality, Washington, http://www.edexcellence.net/institute, (accessed on 5 December 2018). [34]

Welsh government (2017), *Connecting Research and Teacher Education: Quality Enhancement for ITE Partnerships*, Education Directorate, Welsh Government,, http://learning.gov.wales/resources/browse-all/connecting-research-and-teacher-education/?lang=en. [83]

Wilson, S., R. Floden and J. Ferrini-Mundy (2001), *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, Center for the Study of Teaching and Policy, Washington DC, https://www.education.uw.edu/ctp/content/teacher-preparation-research-current-knowledge-gaps-and-recommendations (accessed on 4 October 2018). [60]

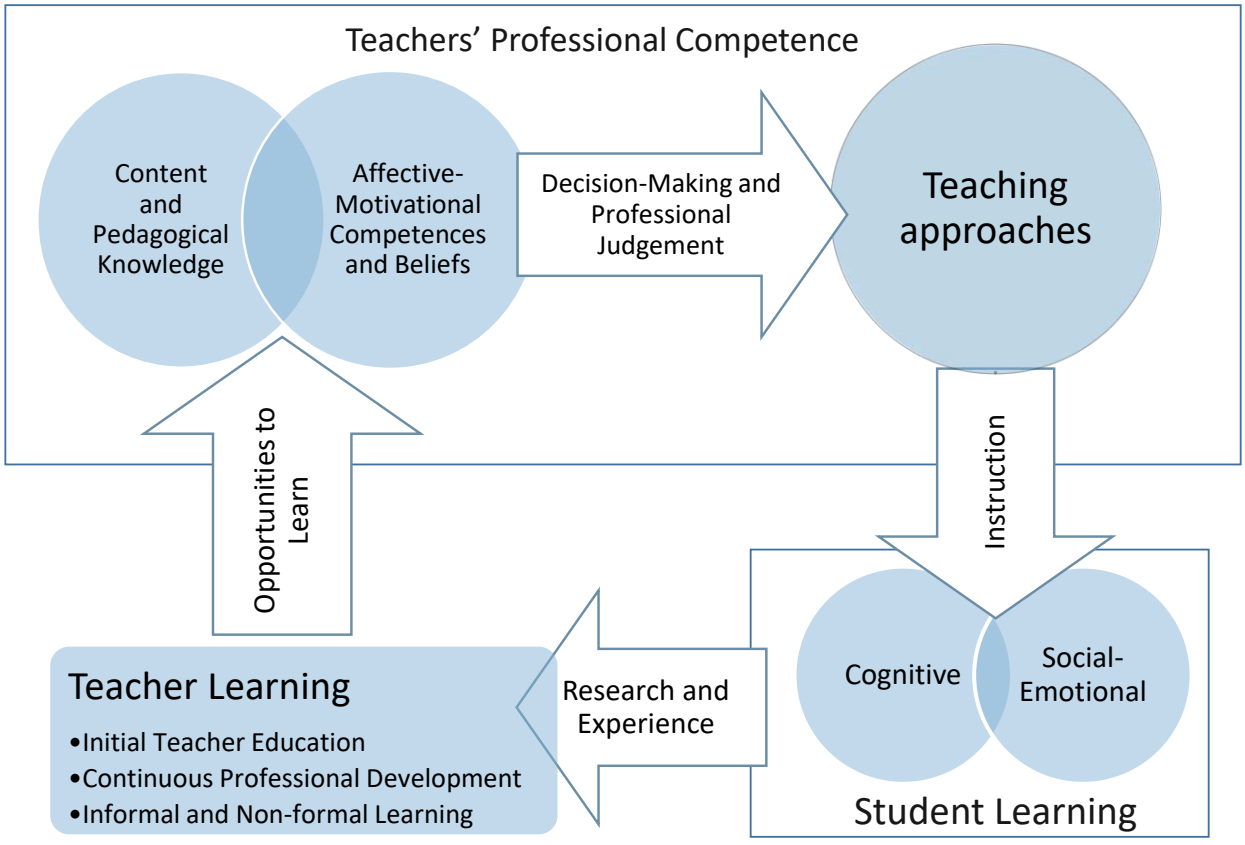
Zeichner, K. (2014), "The struggle for the soul of teaching and teacher education in the USA", *Journal of Education for Teaching*, pp. 1-18, http://dx.doi.org/10.1080/02607476.2014.956544. [33]

Chapter 4. How can initial teacher preparation equip teachers with updated knowledge and competences?

This chapter discusses the challenges related to equipping teachers with the necessary competences and ensuring that the profession's knowledge base is regularly updated. It first provides a framework that helps understand professional competence in its complexity. The first challenge countries are experiencing is providing a coherent and comprehensive curriculum that covers all knowledge domains, and develops practical skills and theoretical knowledge in a synergetic way. The second challenge relates to integrating new evidence and emerging models into teacher education curriculum. Thirdly, countries are facing barriers in aligning initial teacher education curriculum and the school context. Lastly, the chapter explores challenges related to building capacity among teacher educators. The chapter suggests that addressing these challenges involves ongoing reflection on teachers' knowledge, strong ITE-school partnerships and supporting teacher educators. Specific ideas are outlined in the last section to help policy makers, teacher education institutions and schools to implement these strategies.

Teachers today need to respond to complex expectations such as meeting the individual needs of increasingly heterogeneous groups of students, developing 21st century skills such as critical thinking and problem-solving, as well as social-emotional skills, keeping up with technological change, and so on (OECD, 2017[1]). In addition, they are often expected to take on new responsibilities including collaborating with colleagues and other professionals, establishing partnerships, participating in leadership and management. Importantly, teacher candidates also need to learn how to become enquiring and adaptive practitioners able to evolve their practice as the curriculum continues to change and as new evidence emerges. To respond to such diverse expectations, teachers' professional competence needs to be understood as a complex concept.

Figure 4.1. OECD Conceptual model for teachers' professional competence



Source: Guerriero and Révai (2017[2]), Knowledge-based teaching and the evolution of a profession, in: Guerriero (2017) *The Changing Nature of the Teaching Profession*, OECD Publishing.

In line with extensive evidence, the OECD's conceptual framework (Figure 4.1) models teachers' professional competence as a multi-dimensional construct (Guerriero and Révai, 2017[2]). This encompasses the professional knowledge base of teachers – content and pedagogical knowledge – as well as affective-motivational competences (Guerriero and Révai, 2017[2]). Teaching also requires decision-making skills and professional judgement that allow teachers to analyse and evaluate specific contexts or learning episodes and, drawing on their knowledge and competences, make decisions about teaching approaches and instruction. Teaching approaches refer here to curriculum and lesson planning, selecting and applying sets of teaching methods, ways of classroom management, student

assessment, and so on, while instruction is the implementation of these approaches in the classroom (Guerriero and Révai, 2017[2]).

This conceptual framework implies a number of challenges for initial teacher preparation (ITP) systems in helping prospective teachers acquire professional competences. In particular, ITP needs to:

- account for multiple dimensions of professional competence
- ensure the connection between knowledge and practice
- ensure the link to schools
- offer prospective teachers authentic learning opportunities.

This chapter focuses on the above challenges specifically related to initial teacher education (ITE), while Chapter 5 discusses challenges related to the transition from initial education to teaching practice.

4.1. Why is this a challenge?

4.1.1. Providing a coherent and comprehensive ITE curriculum

The first challenge relates to ensuring that professional competences are developed in all their dimensions. The different knowledge domains need to be covered on the one hand, and practical competences need to be developed to facilitate decision-making and instruction on the other hand. Doing this in a coherent way is, in many teacher education institutions around the world, strongly hindered by the "episodic" nature of programme delivery, consisting of a set of unrelated courses taught by people who do not work together (Bain, 2012[3]).

Covering all knowledge domains

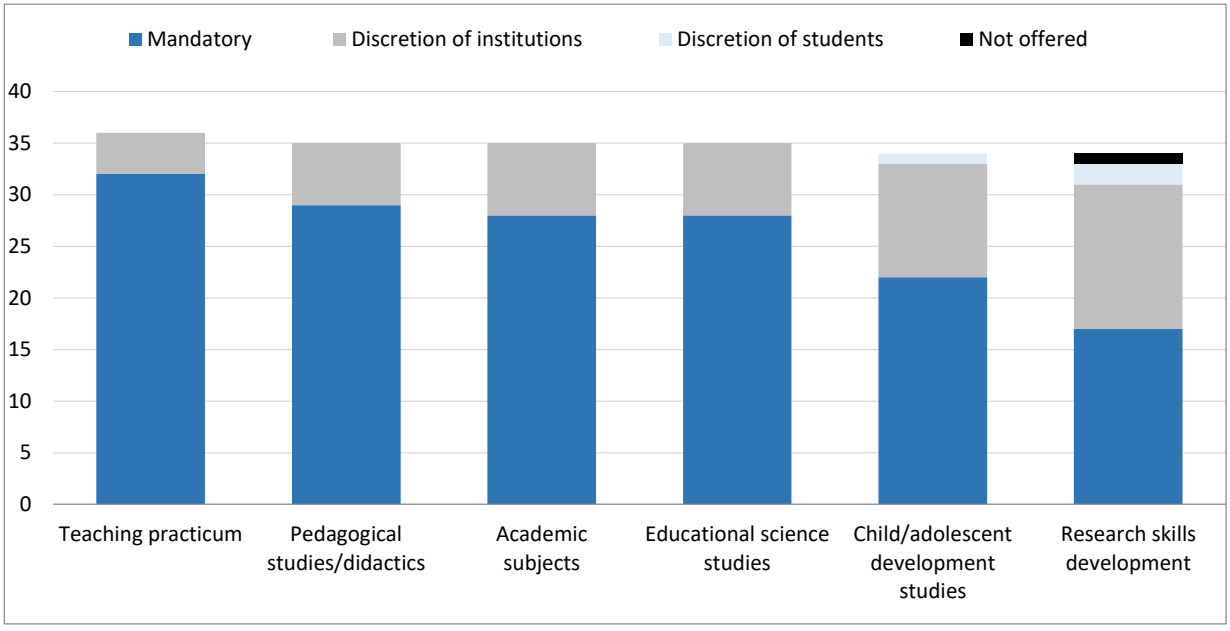
Striking the right balance between breadth and depth in ITE curriculum is no easy task. Teacher education needs to prepare teachers in content knowledge (knowledge of a specific subject content), pedagogical content knowledge (knowledge of the teaching and learning processes particular to a subject), as well as general knowledge of pedagogy (knowledge of teaching and learning that is cross-curricular) (Shulman, 1987[4]). On average, 27% of teachers report that their formal education did not include content for all the subjects they teach, and approximately one in every three teachers did not have formal training in the pedagogy of all their subjects (OECD, 2014[5]). In addition, teachers across OECD countries feel prepared in the different knowledge and skills domains to varying extents (OECD, 2014[5]). On average, 7% of teachers do not feel well prepared in the content and 11% in the pedagogy of the subjects taught (OECD, 2014[5]). Over 10% of teachers also report needs for professional development in areas related to general pedagogical knowledge, such as classroom management, teaching diverse classrooms, or evaluation and assessment (OECD, 2014[5]).

The way teacher education is organised influences how coherence of teacher candidates' experience can be achieved. ITE structure differs across and within countries. The two most wide spread models are concurrent programmes, which provide pedagogical training and practicum at the same time as courses in subject matter, and consecutive models, in which pedagogical and practical training follow courses in subject matter (OECD, 2014[6]) (see Annex B for the ITP model of countries participating in the study). The ITP reviews suggest that independently of the model, countries seem to struggle with finding the balance of subject and pedagogical knowledge. As Figure 4.2 shows, in a number of

countries key knowledge areas are at the discretion of teacher education institutions. Among countries participating in the ITP study, in Japan there is a strong focus on both subject knowledge and pedagogical knowledge. The challenge identified here is not having enough depth of understanding due to too many topics, i.e. too much breadth. In Wales, there is a need to strengthen subject-specific knowledge in teacher education, whereas in the United States ITE programmes face the challenge of rapidly building content knowledge due to the insufficient level of entering candidates' content knowledge. In Korea pedagogical content knowledge needs to be strengthened in teacher candidates' knowledge base.

Figure 4.2. Content required for initial teacher training (2013)

For teachers teaching general subjects in public institutions, lower secondary education



Source: OECD (2014[6]), Education at a Glance, OECD Publishing, Paris.

Developing practical skills linked to theoretical knowledge

Prospective teachers need not only to be prepared in the different knowledge areas, but also equipped with practical skills that allow them to make appropriate professional judgements and decisions, and deliver effective instruction (as emphasised also by the conceptual model in Figure 4.1). Establishing strong links between theoretical and practical training has long been on the teacher education agenda and is discussed in more details in Chapter 5. One way to achieve this is through aligning teacher education to professional standards. Among the countries to taking part in the ITP study, this effort is most visible in Australia, where teacher education institutions need to demonstrate how their courses prepare candidates to meet the standards in order to be accredited (TEMAG, 2014[7]) (Table 4.3/1). Nevertheless, such alignment is not straightforward due, in part, to the different conceptualisations of professional knowledge (Révai, 2018[8]). For example, teacher education institutions with strong academic traditions often reflect a knowledge and research-based conceptualisation, while standards would often have stronger

emphasis on practice and a more restricted understanding of what professional knowledge is (Révai, 2018[8]).

A key determining factor in linking theory and practice relates to the knowledge traditions of educational studies (Whitty and Furlong, 2017[9]). Some countries and institutions still follow an academic knowledge tradition in teacher education, i.e. the content is structured in classical disciplines: educational psychology, sociology, history and philosophy (Whitty and Furlong, 2017[9]). In such a context the content is often determined by the epistemological traditions of each of these disciplines delivered by different faculties (Whitty and Furlong, 2017[9]), and therefore the knowledge base relevant for teaching and learning is fragmented and often very theoretical. Examples among countries participating in the ITP study facing this challenge are Japan, Korea and Norway. The ITP review identified a lack of systematic collaboration of different university faculties as a weakness in some systems. In Japan, for example, most education faculties have limited interactions with other faculties that provide subject specialist training. As a result, interviewees in Japan reported a lack of practical training, for example, in relation to student behaviour and dealing with parents. In Norway, due to the strong theoretical and subject content focus, teacher candidates reported to be less well-prepared for the realities of teaching. The ITP reviews noted in all countries that connection between content and process, and between subject, pedagogical content and general pedagogical knowledge should be stronger and better articulated.

Some countries or institutions have a practical knowledge tradition that is based on teachers' tasks such as lesson planning, classroom management, evaluation (Whitty and Furlong, 2017[9]). Such a tradition, like the one in some Welsh institutions, is strong in developing practical skills, but these are not sufficiently underpinned by formal knowledge, theories and evidence. A third category identified by Whitty and Furlong (2017[9]) is integrated traditions. Good examples for this are the clinical practice model found in some institutions in Australia and the United States (see Box 5.2 in Chapter 5 and Table 4.3/2). The ITP study found that while integrated models have the potential to create more coherence between theory and practical training, as well as between general and subject pedagogy, this requires dialogue and co-design between universities and schools, and within universities. Moreover, "applied knowledge" for teaching is contingent on the skills and experience of individual teacher educators, and the willingness of individual schools to work more closely with universities. For example, the quality of the practitioner enquiry or action research based models that characterise some institutions in Wales very much depends on the research skills of teacher educators, as well as the rigour of education research conducted in the university in general.

4.1.2. Continuously integrating new evidence and models of teaching and learning in ITP curriculum

The second challenge relates to connecting professional practice (teaching approaches and instruction) to the knowledge base that is continuously updated with new evidence on teaching and learning.

Ensuring effective knowledge flow involves creating strong links between the production and use of formal research knowledge, data and indicators, but also the professional knowledge of teachers and other education stakeholders (Burns, Köster and Fuster, 2016[10]). This also necessitates determining what knowledge will be relevant in the different contexts (Fazekas and Burns, 2012[11]). Education has long been struggling with establishing knowledge mobilisation mechanisms to ensure that teachers' everyday

pedagogical judgements are sufficiently underpinned by evidence (Révai and Guerriero, 2017[12]). ITP and ITE, in particular, have a fundamental responsibility in establishing such mechanisms and ensuring that teacher candidates are equipped with the most recent and most salient evidence on teaching and learning.

New understandings and evidence on teaching and learning are emerging from various fields. The growth of meta-analyses and systematic reviews makes it easier to take an overview of emerging evidence and build it into teacher education. John Hattie's work on Visible Learning (Hattie, 2008[13]) and the development of the Sutton Trust Toolkit (Education Endowment Foundation, n.d.[14]) are two powerful examples of the way research reviewing is enabling increasingly evidence-informed teacher education and teaching practice. New insights from cognitive neuroscience and exploration of 21st century skills are generating new knowledge demands on teachers and teacher educators (Guerriero, 2017[15]). Such emerging evidence necessitates regularly revising and adapting all knowledge domains of the teacher education.

However, integrating new evidence in ITE is challenging for several reasons. First, teacher educators do not necessarily access new evidence easily. In a fragmented system, educational faculty can be far from disciplinary researchers (e.g. neuroscientists), and communication channels such as specialist journals or conferences do not always target teacher educators. The ITP study identified a lack of access to the latest education research for teachers in Wales, also noted in a recent report on teacher education in Wales (Furlong, 2015[16]). Second, some of the emerging evidence is not immediately relevant for teaching and learning. Teacher educators and teachers need thus not only access, but also interpret and translate research to make it more relevant for practice (Révai and Guerriero, 2017[12]). Third, the rigidity of institutional processes and external pressures can be obstacles to integrating new evidence in teacher education curriculum. In Korea, the ITP review underscored the problem that high stakes examination process, national curriculum, employment examinations and evaluation in general dominate and militate against evidence-based innovation. In Norway, institutions reported that they did not have sufficient time to embed new approaches partly due to a large amount of reforms and limited consideration of implications of changes. Some universities in Japan on the other hand, have priorities to continuously update their curriculum to reflect contemporary issues.

In parallel to emerging evidence, there have been concerns about the robustness of evidence in education to form the basis of professional practice in a systematic way (e.g. (Hargreaves, 1996[17]; Révai and Guerriero, 2017[12]; Dumont, Istance and Benavides, 2010[18]). Evidence is often scattered, sometimes controversial, and sometimes only small scale, context-specific qualitative studies are available. For example, innovative pedagogical approaches are emerging changing some of the traditional models of teaching and learning (Paniagua and Istance, 2018[19]). But to date there is little evidence on whether these really enhance student learning, and if so, in what context they are effective, and what professional expertise is needed to apply them (Paniagua and Istance, 2018[19]). Another example is technological development and the use of digital tools in learning. Many students and teachers have today access to various digital technology, but little is known about how to use these to enhance learning on the one hand (NASA, 2018[20]), and what professional knowledge is required on the other hand (Willermark, 2017[21]). Using information and communication technologies in teaching is also an area in which a high proportion of teachers report needs for professional development (OECD, 2014[6]).

In order to build a robust and systematic knowledge base for teaching and learning, teacher education institutions need to shape the research agenda and contribute to producing evidence (Révai and Guerriero, 2017[12]; Hargreaves, 1996[17]). Many scholars argue that this involves efforts to use robust methodologies (e.g. randomised control trials, meta-analyses) to confirm (or reject) and systematise emerging findings (OECD, 2007[22]). The ITP review found that in some countries, such as Wales, there was a lack of discussion in teacher education institutions about a research strategy and about building a field-wide body of evidence on what works. The ITP review itself was an initiative by the Welsh government to address this challenge. At the same time, there is a need to produce research that responds to teachers' needs (Hiebert, Gallimore and Stigler, 2002[23]). Methodologies such as action research (also called practitioner enquiry) or design-based research are appropriate to formulate research questions that are generated by teaching practice (European Commission, 2015[24]). For example, some institutions in Wales require teacher candidates to conduct action research, but there are little or no opportunities to conduct other types of research, and no efforts are directed toward systematising localised and contextual findings into an integrated body of knowledge (Furlong, 2015[16]). In Korea, the review team found little focus on enquiry and experimentation to produce new evidence. By contrast, the Japanese lesson study was identified as a promising practice in generating local evidence directly relevant for teaching practice, although there would be a need to synthesise these across the system (Table 4.3/5). In the Netherlands, partnerships between schools and universities of applied sciences are conducting school-based research projects in collaborative and structured ways to build research that is relevant to teachers (Table 4.3/7).

4.1.3. Aligning ITE content with the school context and curriculum

The disconnect between teacher education institutions and schools – one of the biggest challenges the ITP study identified – results in ITE that has often little connection with the realities of schools. This problem is further discussed in Chapter 5,where we focus on ITE curriculum. The ITP reviews noted that ITE providers in general, and teacher educators specifically, do not have established communication channels and mechanisms to keep up with recent school policies such as school curriculum reforms.

New developments in school curriculum need to be considered when designing teacher education. Yet, creating efficient feedback mechanisms between teacher education and schools is a challenge in many countries. In several countries, such as Australia, the United States and the Netherlands, schools and school boards reported that their feedback to teacher education institutions is not always acted upon, and changes to school practices do not necessarily lead to updates in ITE. Limited school voice was also reported in Korea, where professors often lack experience in teaching in schools and explore ITE quality issues mostly with university staff and review teams. In Japan, on the other hand, the ministry sets strong guidelines for teacher education institutions to follow national curriculum in schools (Table 4.3/4). Also, some universities in the Netherlands survey their graduates and those with strong school-university partnerships reported to take such feedback on board.

A coherent school and ITE curriculum requires strong partnerships between institutions. For example, reforming school curriculum in partnership with teacher education institutions can foster such coherence. In Wales, the new curriculum has been developed in partnership with a network of schools, experts, the inspection and authorities (Welsh Government, 2015[25]), although it is not clear to what extent ITE institutions were involved in this process. In the Netherlands, the ITP review noted strong collaboration

between some teacher education institutions and schools (see Box 4.3 and Table 4.3/7), although some of these initiatives depend on short-term funding that may risk their sustainability.

National school curriculum changes surprisingly frequently in a number of countries. Many education reforms affect the curriculum as new governments seek to operationalise their manifestos and respond to socio economic changes and newly emerging evidence. A large number of countries are actively engaged in the OECD Education 2030 project, which – involving numerous stakeholders – has developed a Learning Framework to define a clearer vision and goals for the future of education systems (OECD, 2018[26]). The Learning Framework identifies the importance of integrating learning across knowledge and skills while at the same time developing the attitudes and values that students will need to shape their world (OECD, 2018[26]). Such integration is at an early stage of conceptualisation (Lucas, Claxton and Spencer, 2013[27]) and development, so there is relatively little evidence to draw upon in developing pedagogical understanding of how to successfully do this in schools. Regardless of the specific directions that curriculum reforms will take in the future, the pace of change in societies is likely to translate into growing pressures for a constant evolution of school curricula. ITE programmes will need to adapt to this and develop means for better connecting with schools and responding to these changes.

4.1.4. Teaching teachers in line with emerging evidence and new models – the role of teacher educators

It is however not enough to revise ITE curriculum regularly. A vital element of authentic learning opportunities is "teaching as you preach". That is, new models of teaching and learning, and emerging evidence need to be reflected in the delivery of teacher education. This implies that teacher educators themselves need not only to update their knowledge base, but also to adjust their practices to provide an authentic and coherent role model of teaching to their students (Lunenberg, Korthagen and Swennen, 2007[28]). Role modelling makes this profession unique (Cochran-Smith et al., 2015[29]), differing, for example, from the medical profession in that teacher educators demonstrate their practice directly on teacher candidates by teaching them, unlike, for instance, surgeons who do not operate on medical students (Lunenberg, Korthagen and Swennen, 2007[28]).

A lack of coherence between delivered content and actual practice is of concern in some teacher education programmes. For example, while most programmes have promoted constructivist views of learning, whether and to what extent teacher educators actually use these views in their teaching is not clear (Cochran-Smith et al., 2015[29]). On the other hand, some studies suggest that sociocultural perspectives on teacher learning have been widely taken up by teacher educators through practices that involve teacher candidates interacting, negotiating and, through that, learning from each other, as well as teachers and university supervisors collaborating (Cochran-Smith et al., 2015[29]).

As a European Commission (2013[30]) report underlines, one key challenge linked to the heterogeneity of this unique profession, is that teacher educators' multiple identities lead to varying levels of commitment to teaching future teachers. Besides the faculty of education, in which staff members are likely to consider themselves as teacher educators, many ITE programmes involve staff from subject faculties, who spend a limited amount of time on teacher education. The report raises concerns about the ineffective role modelling due to poor teaching practices of staff that do not have a strong teacher educator identity (European Commission, 2013[30]).

The ITP study identified a number of challenges teacher educators are facing. In Wales, a risk of fatigue among teacher educators was noted due to the high workload and pressure to teach as well as conduct research. In the United States, teacher educators' career incentives are based on research publications, and not preparing practitioners, which impedes a stronger focus on adapting innovative teaching approaches or implementing programme reform. In Korea, high stakes for teacher education institution's rating may limit innovation and the adaptation and sharing of new practices.

4.2. What strategies can address the challenge?

4.2.1. Continuously reflecting on what knowledge and competences are relevant for teaching

Ensuring a comprehensive, coherent, relevant and continuously updated ITE requires engaging regularly in collective reflections on teachers' knowledge, and more broadly, professional competences. A number of countries have introduced professional standards for teachers as a tool to make knowledge and competence requirements explicit. However, if standards are used as rigid checklists for accountability purposes (certification, evaluation), they do not facilitate continuous reflection. To the contrary, they can constitute a risk to flexibly including emerging evidence and innovation in both schools and ITE. Moreover, standards do not easily and directly translate into ITE curriculum due to the often conflicting conceptualisations of knowledge, and the complex processes of interpretation and translation (Révai, 2018[8]). Standards and ITE curriculum can nevertheless constructively influence each other if standards are used as communication and reflection tools and are regularly revised (Révai, 2018[8]).

Developing and creating artefacts other than standards, such as teacher education guidelines or course descriptions, can also create a platform for dialogue on what knowledge and competences are relevant for teacher candidates and teachers. An example for this is the collaborative process of a wide group of professionals in Norway who worked together to translate new ITE regulations into national teacher preparation guidelines Table 4.3/11). This development and constructive co-critique of the guidelines generated both institutional and cross-institutional working groups. Regular professional dialogues can however also be facilitated independently of developing documents. Teachers within and across schools, and more importantly together with researchers, teacher educators and other stakeholders can generate platforms for collaborative reflections. The OECD's TALIS Global Video Library [1]is an initiative that has the potential to function as such a platform (OECD, 2017[31]). An example for a one-off dialogue is the unique opportunity the ITP final conference provided for a range of international stakeholders to reflect on the qualities teacher educators and new teachers should have (see Box 4.1).

Box 4.1. Qualities of new teachers and teacher educators as defined in the final conference of the ITP study

Experts and policy makers from a number of countries including those that participated in the ITP study gathered at a final conference to share and discuss review findings, agree on common challenges in ITP systems in participating countries and begin to identify principles of effective ITP systems.

As part of identifying these principles, small working groups of attendees brainstormed the most important qualities of teacher educators and new teachers. The groups used various OECD, EU and country-specific frameworks related to teacher values, knowledge and competencies as an input to this process. Attendees reviewed and synthesised these qualities into the following lists. Due to the nature of this process, these lists are not comprehensive, nor universally applicable. They could however serve as a starting point for discussions and reflections among stakeholders.

Table 4.1. Qualities of new teachers

Domains	Characteristics
Basic knowledge and skills	• High level of academic skills • Foundations of subject didactics / pedagogical content knowledge • Pedagogy / general teaching capabilities • Ability to analyse data (See also research mind) • Curiosity and willingness to learn and improve • 'Research mind' / 'critical mind' / metacognitive capabilities • Know how to give and receive feedback (to students and as teachers)
Communication and relationship skills	• Ability to communicate and collaborate (communication and relationships); ability to share and collaborate with colleagues • Ability to build relationships with learners • Collective efficacy: orientation to collaborating and having professional dialogue with other teachers on aspirations for students (the difference between a candidate and a new teacher is orientation to student outcomes beyond the self)
Confidence, resilience, proactivity	• Confidence in pedagogy (might not yet be expertise); confidence in their knowledge and ability to express their own knowledge and opinion to more senior teachers • Resilience ('strong and not run away after first disappointment') • Proactive / take action
Values	• Sense of mission and responsibility • Mindset that all students can learn / high aspirations for all learners • Ethical mindset

Table 4.2. Qualities of teacher educators

Domains	Characteristics
Basic knowledge and skills	• Expertise in pedagogy; professional knowledge; specialist in first and second order teaching (ie specialist in teaching and teaching about teaching) • Research base • Modelling; doing, showing and feedback
Willingness to learn	• Reciprocal relationship (learning both ways)
Communication and relationship skills; adaptability	• Ability to build relationships with learners; empathetic to what candidate is experiencing • Boundary crosser and a participant in schools, programmes and research

	community; ability to bridge theory and practice (especially for subject specialists)
Values and vision	• Sense of mission; having an ambitious vision for what's possible for students and teacher candidates • Passion for learning and subject area • Commitment to quality

4.2.2. Fostering deep school - teacher education institution partnerships and feedback loops

Establishing partnership is an essential pillar to build capacity and foster feedback mechanisms and thereby to improve the system (Toon, Jensen and Cooper, 2017[32]). Deep partnerships between schools and universities can take multiple forms and extend to designing and evaluating programmes together, sharing data and information, observing and sharing practices and so on (Toon and Jensen, 2017[33]). Teacher education institutions and schools working together can facilitate the alignment of school and ITE curriculum. For example, those leading the translation of system-level policy reforms into a curriculum and infrastructure for an ITE programme should engage with colleagues leading parallel translation processes within the school system. This would ensure that both strands of development are coherently articulated.

Such partnerships are important in enabling teacher educators based in ITE institutions to keep in touch with school-based developments of practice and relate these to the wider evidence base. At the same time, partnerships also encourage school-based educators to prioritise professional learning and see engagement with ITP as a contributor to their own professional growth. Sharing data, providing feedback and jointly designing and delivering improvements to ITP and early career support can lead to a more coherent experience of beginning teachers (Toon and Jensen, 2017[33]).

Research partnerships between schools and universities can build the research skills of teachers and the practical knowledge of researchers (Greany et al., 2014[34]). Various mechanisms can support research partnerships between schools and universities, such as including school-based research in teacher education programme requirements, incentivising education faculty to raise the impact of their research on teaching and learning or introducing funding mechanisms (e.g. competitive grants) that provide opportunities for teacher educators and researchers to collaborate with teachers and schools in conducting schools-based research.

4.2.3. Supporting teacher educators to continually improve their knowledge and practice

While the status of teachers has now been generally acknowledged as important for successful education policies, much less is known about teacher educators. Yet, their central role in developing teachers makes it indispensable to acknowledge teacher educators as a unique occupational group with distinctive knowledge, skills and understanding about teacher education and its importance for schooling (Murray, Swennen and Shagrir, 2009[35]). In fact, there is still a debate about who teacher educators are (Murray, Swennen and Shagrir, 2009[35]; European Commission, 2013[30]). Recently, teacher educators have been defined as teachers of teachers to include not only those working in higher education, but more generally those engaged in the induction and professional learning of future teachers through pre-service courses and/or the further

development of teachers (Murray, Swennen and Shagrir, 2009[35]; European Commission, 2013[30]).

In a number of countries teacher educators are predominantly appointed, evaluated or promoted based on their scientific work (Sonmark et al., 2017[36]), while their numerous other roles including coaching, facilitating collaboration among diverse organisations and stakeholders, assessing, developing curriculum, conducting research and engaging in critical enquiry are often neglected (Czerniawski, Guberman and Macphail, 2017[37]). Indeed, teacher educators need more support in their diverse roles, more opportunities for professional development, and would also benefit from induction, which currently does not exist in most systems (Sonmark et al., 2017[36]; Czerniawski, Guberman and Macphail, 2017[37]; European Commission, 2013[30]).

Although research on teacher educators is growing, there is still a need to build evidence about their status and quality. Some studies point to the low or ambiguous status of teacher educators, in particular those in academia, others report that their voice is seldom heard in the education agenda (Davey, 2013[38]). An indication of this phenomenon is that issues of teacher educators (e.g. their selection and training) are included in only three of the country background reports produced in the ITP study: Australia, the Netherlands and Norway. In the Netherlands teacher educators are considered as key stakeholders, and are also represented by the Dutch Association for Teacher Educators (see Box 4.2 and Table 4.3/8). This group's key role in ITP design is acknowledged in Norway, and is manifested for example in the National Research School for Teacher Educators, or the Knowledge Parliament initiative (Table 4.3/10).

It is thus fundamental to consciously and strategically promote the status of this profession, starting by the assumption that an excellent teacher educator is more than an excellent researcher. Teacher educators need to be considered as a distinct professional group within teachers in higher education and in schools, with a deep mastering on teaching strategies tailored for the need of teacher candidates. Echoing the needs of teachers in schools, teacher educators should be provided with opportunities to participate in communities of collaborative enquiry centred on improving their teaching practice, and integrating new evidence and models on teaching and learning. In this regard, collaboration between teacher education institutions and school-based teacher educators can help develop a robust knowledge base for all teacher educators (Toon and Jensen, 2017[33]).

4.3. How can the different actors apply these strategies?

4.3.1. What can policy makers do?

Raising awareness and facilitating dialogue to develop a shared language and understandings of professional knowledge and competences

Raising awareness of the importance of a coherent, comprehensive ITE curriculum that is regularly updated with new evidence is a first step in building policy makers' capacity. Korea is a promising example in that sense, where – despite the challenges noted earlier – the ITP review highlighted the shared belief in deep content knowledge and the importance of developing this knowledge as a key strength. In Korea there is a global interest in research informed policy and practice in teaching and ITE. Korean policy makers also recognised that ITE curriculum needs to prepare for the fourth industrial revolution (Table 4.3/6).

Facilitating dialogue among policy makers and with ITE stakeholders of quality delivery of programmes helps establishing a shared understanding of what quality means. The ITP study noted a growing awareness in the United States of the importance of improving programme quality. This manifested in a national dialogue about the quality of teacher preparation, which led to the introduction of federal regulations. States are now required to report on programme outcome measures (e.g. graduate employment and retention in teaching, feedback from graduates and their employers, and student learning outcomes).

Policy makers can also facilitate the development of a common language around teacher professionalism as a framework and basis for building capacity across schools and ITE institutions. The Australian Federal Government invested strongly on a wide consultation process for developing the Australian Professional Standards for Teachers (Table 4.3/3). These standards then formed the basis of ITE programme accreditation (Table 4.3/1). Another way to do this is through creating the conditions for the profession to establish its own professional standards or competence frameworks. Policy makers can also create a regular discussion platform for teachers, teacher educators, ITE leaders with the objective of revising and renegotiating the content of standards, ITE programmes and accreditation. The Welsh government for example has been engaging a wide range of stakeholders both in the development of new ITE accreditation criteria (Table 4.3/16) and the revision of teaching standards (Welsh Government, 2017[39]). The regular monitoring and analysis of the change of both standards and teacher education curriculum can lead to a more systematic and integrated knowledge base of teachers in the long term (Révai, 2018[8]).

Building capacity both through formal structures and informal peer learning processes

System level support for translating policy reforms into practice and designing ITE curricula should include appropriate opportunities for all stakeholders to build their knowledge on curriculum design and implementation. A specific form of building systemic capacity is to establish formal structures. The National Centres of Excellence established by the Ministry of Education and Research in Norway are a good example of systemic opportunities for collaboration and capacity building. This scheme, managed by the Norwegian Agency for Quality Assurance in Education (Table 4.3/12), implies a concentrated, focused and long-term commitment to stimulate the development of teaching and learning methods at the bachelor and master's levels (Table 4.3/10). Establishing and funding high-level (master's and doctoral) degree programmes in leadership, subject and general pedagogy is a strong way of building capacity of teachers, teacher educators and future leaders of ITE.

Informal processes such as peer learning are essential supplements of formal structures in capacity building. In Australia, there are opportunities for ITE leaders to share data and approaches, and to learn from one another in cycles of design and assessment. The Dutch ministry together with best practice teacher education institutions are creating a culture of collaboration, co-operation and "learning together", evidenced by many school-university partnerships (Table 4.3/7). As part of its investment in building system-wide research capacity in education, the Welsh government actively facilitates the development of schools as learning organisations (SLO) (OECD, 2018[40]) (Table 4.3/17). The SLO model, co-constructed by a range of stakeholders, includes elements essential for capacity building such as continuous professional learning, and a culture of enquiry, innovation and exploration (OECD, 2018[40]).

Ensuring sustained funding to scale good practices

Strengthening processes in which institutions can learn from each other can help scale rigorous and effective programmes. The Netherlands encourages deep collaboration between selected schools and universities through a 'quality check' that sets expectations of what a good school-university partnership should look like (Table 4.3/7). The accreditation body has to approve these school partnerships before they are funded. Such well-funded partnerships stimulate innovation and encourage the implementation of high-quality collaborations on research and teaching development. The ongoing funding of these partnerships, and how to support others are important questions to address in order to ensure that effective collaborations are sustained and scaled across the system.

4.3.2. What can teacher education institutions and the teacher educator profession do?

Defining professional standards or guidelines for teacher educators and teacher candidates

Defining professional standards or guidelines for teacher educators is a way to articulate what capacity they need. In the Netherlands, there are collaboratively developed frameworks that set system-wide minimum standards for quality (Table 4.3/9). For example, the standards for teacher educators, developed by the Dutch Professional Association for Teacher Educators, define expectations for the base level of what teacher educators need to know (see also Box 4.2 and Table 4.3/8). In Norway, institutions collaborate on developing national guidelines for ITE (Table 4.3/11).

Being engaged in reflecting on and defining what knowledge and skills teacher candidates need to learn is also a way to improve ITE. In Australia, professional standards for teachers are also used to (re)structure ITE programmes (Table 4.3/3), and ITE leaders are generally invested in the standards and interested in refining and strengthening how prospective teachers are prepared.

Box 4.2 Educating the teacher educator: the importance of professional standards

Although most teacher educators have one or more post-graduate degrees in education or other related fields, they have rarely been formally and specifically prepared for their role. In most countries, teacher educators are not provided with induction or professional education, and are both an under-researched and poorly understood occupational group. In this context, central policies to quality requirements and professional competences are highly valuable to support the development of the teacher educator profession.

In the Netherlands, the Dutch Professional Association for Teacher Educators (VELON) developed the Dutch Professional Standards for Teacher Educators and a registration procedure in order to clarify the nature of the profession, offer a guideline for professional development, and a benchmark for professional registration. The standards contain competence areas and skills of effective teacher educators and a "knowledge base" to sustain the building of a shared knowledge in this community of professionals (Table 2.3/8).

Introducing incentives for teacher educators to continuously develop their knowledge of teaching and improve their teaching practice

Institutional incentives for teacher educators such as performance evaluations and promotion criteria should extend to teaching competences, and updating and deepening knowledge on teaching and learning. Incentives can also include conducting school-based research. Such incentives should be accompanied by access to relevant professional development opportunities and dedicated resources for teacher educators. Most importantly, these efforts and incentives should be positioned as a way of developing collective efficacy amongst teacher educators and thus enhancing their quality and status as academic and teaching professionals. In the Netherlands, teacher education institutions collaborated to develop "knowledge bases" that describe what teacher candidates must learn as part of their preparation. These can function as tools to improve coherence, transparency and accountability through setting the same minimum expectations for beginning teachers across teacher educators and teacher education institutions (Table 4.3/9). A promising initiative was identified at the University of Michigan in the United States, where a clinical professor career (and promotion) track was introduced as an incentive for university professors to conduct school-based research and focus on preparing teachers (Table 4.3/13).

Establishing a strategy for self-improvement using data

Institutions can collect and use data for formative reviews and improvement plans. For example, feedback from stakeholders – teacher candidates, school-based mentor teachers, staff – can provide important input for improvement. In Korea, teacher education institutions use a variety of ways to review and improve their programmes including student course surveys and feedback from schools via school-university partnerships. Teacher education institutions also report that evaluation processes motivate improvement in general and provide useful information on what to target specifically. Although, as noted earlier, when the outcome of evaluation has high stakes for institutions, it can also limit innovation. A number of states in the United States collect data to review the effectiveness of their graduates (Table 4.3/14). If these measures are valid, reliable and professionally accepted they will help identify which programmes are effective and build the evidence base of what works. The Deans for Impact initiative in the United States mentioned in Section 2.3 in Chapter 2 is another example of how collected data can empower participating programmes to engage in cross-institutional learning (Table 4.3/15).

Collecting and making research on teaching and learning easily accessible

Teacher educators play a key role in mediating research evidence (Sonmark et al., 2017[36]). Creating a "repository" where teachers and teacher educators can access education research in an easy-to-read manner is one way to strengthen the link between theory and practice. This could be even more impactful and robust if developed in collaboration among ITE institutions. ITE institutions can also organise training for teachers and school leaders in how to use such a repository. In addition, it can help organise available evidence and identify research gaps to set future research directions. Wales, for example, may choose to prioritise funding and support for specific research topics that are unique to its context, such as bilingualism, rather than attempt to replicate larger studies conducted in other parts of the United Kingdom (BERA, 2014[41]). A crucial element in research mediation is ensuring that research made accessible for

teachers satisfies high-quality standards. Any such initiatives need therefore to pay attention to quality.

Facilitating peer learning and collaboration across institutions and with schools to improve ITE programmes

Structures that enable universities to provide collegial review and feedback to each other to share ideas and jointly solve issues can contribute to improving the quality of programmes. Specific forms of collaboration can include institutions co-designing programmes, sharing or rotating staff, leading joint research projects and so on. To deepen and scale such partnerships, specific expectations and attributes could be defined and communicated. Several promising initiatives were observed in the ITP reviews. In Australia, universities are starting to engage in collaboration on joint research projects; the Netherlands is making a sustained effort to build collaboration among universities and with schools (see Box 4.3 and Table 4.3/7); in Norway an annual "Knowledge Parliament" is held for teacher educators to explore issues such as research based ITE, teachers' knowledge and practice (Table 4.3/10). ProTed, a Norwegian Centre of Excellence in Higher Education is leading the collaborative work of teacher educators doing revisions to ITE programme guidelines to increase coherence and links with practice (see also Box 2.1. and Table 4.3/10).

Box 4.3. Strong school – teacher education institution partnerships in the Netherlands

Responding to concerns from schools and school boards about the "classroom readiness" of newly qualified primary teachers, the Dutch Ministry of Education, Culture and Science facilitates and funds collaboration among universities of applied sciences (HBOs), which provide training in primary education, with school boards, and with individual schools. As a result, almost half of ITE institutions are now working closely with schools on course design and delivery.

One example of this is between Hogeschool Leiden and Snijderschool, Rijswijk that develop ITE and professional development programmes together and drive improvement across their schools.

Some key characteristics of the partnership are:

- The school board employs a teacher educator to oversee the partnership, and provide strategic leadership.
- The school and ITE provider exchange staff and work in each other's institutions.
- The staff from the school and ITE institution work closely together to develop and refine the ITE curriculum and delivery.
- The ITE institution provides mentor training for teachers interested in undertaking this role and to strengthen the link between theory and practice.
- Students, mentors and school leaders are asked for feedback on the programme every year (Table 2.3/7).

4.3.3. What can schools and teachers do?

Defining professional standards or guidelines for new and experienced teachers

Similarly to teacher educators, the teaching profession can also take responsibility in reflecting on the competences beginning teachers need in order to have a confident start in their career. The Australian Professional Standards for Teachers, for example, provide descriptors of four career stages for teachers – Graduate, Proficient, Highly Accomplished and Lead – each representing increasing levels of knowledge, practice and professional engagement for teachers (Table 4.3/3). Although their development was coordinated by a national body (the Australian Institute for Teaching and School Leadership), the process involved state governments, professional organisations, teacher unions and the teaching profession (NCEE, 2016[42]; OECD, 2013[43]).

In the United States, the National Board of Professional Teaching Standards (NBPTS) is an independent organisation governed predominantly by teaching professionals, and partly also by school board leaders, higher education officials, union leaders and community leaders (NBPTS, 2019[44]). The Five Core Propositions developed by the NBPTS articulate what teachers should know and be able to do regardless of grade levels and disciplines. Together, the propositions form the basis of all National Board Standards, which describe how teachers enact the Propositions in particular content areas and with students of particular developmental levels. While the core standards exist since 1989, they have been regularly revised, most recently in 2015 (NBPTS, n.d.[45]).

The new professional standards for teaching and leadership in Wales, developed in 2017 involving the teaching profession, replace the previous Qualified Teacher Status standards (2009), Practicing Teachers Standards (2011) and Leadership Standards (2011) (Welsh Government, 2017[39]). They create a single set of entry standards for the award of Qualified Teacher Status and the successful completion of induction, while their descriptors also contain an aspirational level which provides a focus for career-long professional learning (Welsh Government, 2018[46]).

Participating in the design and revision of ITE curriculum

Schools can create stronger links with ITE institutions in order to feed their experience in the development of ITE programmes. This can happen through school leaders and teachers engaging in partnerships and networks with ITE institutions, but also through school-based mentors strengthening the link with university-based teacher educators related to teacher candidates' field experience and the support of beginning teachers. Strong school-university partnerships in the Netherlands include exchange of staff; mentors, school leaders and students giving structured feedback on ITE programmes; and staff from schools and teacher education institutions working closely together to develop and refine the ITE curriculum and delivery (Table 4.3/7).

Leading and contributing to school-based research

Schools and teachers engaging in research is an important way of facilitating knowledge dynamics in the profession (Sonmark et al., 2017[36]; Révai, 2017[47]). Schools can create supportive structures and processes for innovation and research-based enquiry. To ensure the rigour of teacher-led research, schools can set up coaching schemes to support teachers in accessing, engaging with and designing research (e.g. involving researchers to train teachers in research methods) (Cordingley, 2016[48]). Practice-based research is

widespread across multiple stakeholders in Wales (Box 4.4), and the ITP review noted an eagerness on the part of some schools to participate in research (Table 4.3/18).

Box 4.4. Research-based professional learning in the Fern Federation, Wales

The Fern Federation consists of two small primary schools in a deprived area of Wales. The schools were federated by the regional council as part of a school improvement strategy since both schools showed unsatisfactory results. Over the last four-years-and-a-half, the schools have established a strong professional learning culture to consistently develop teachers' understanding of general and subject based pedagogy. Professional learning is based on systematic enquiry in a strongly research-based way. Teachers work on areas of pedagogy that they identify as worth improving (for example, questioning, assessment for learning, children's engagement, collective learning). They design teaching approaches and lessons, and use observation and video recordings to review and analyse their own performance.

Teachers' learning process and products (e.g. research outcomes and findings related to a theme, videos and collective reflections) are systematically stored and are accessible any time. Other important structures accompanying professional learning are co-coaching sessions and mentoring for teachers requiring further assistance Table 2.3/18).

Révai (2018[49]), Teachers' knowledge dynamics and innovation in education – Part II., Pedagógusképzés

Table 4.3. Practices to ensure an evidence-informed, self-improving ITP system

Reference number	Title of practice	Country
1	New accreditation for initial teacher education programmes in Australia	Australia
2	Clinical practice approaches in initial teacher education in Australia	Australia
3	Australian Professional Standards for teachers	Australia
4	Exploring the alignment of initial teacher education to the new national curriculum in Japan: Teaching for active learning	Japan
5	The use of lesson study to develop teachers in Japan	Japan
6	Attracting and developing teachers for the 4th industrial revolution in Korea	Korea
7	Schools and teacher education institutions co-creating ITE programmes in the Netherlands	The Netherlands
8	Industry-developed Professional Standards for Teacher Educators in the Netherlands	The Netherlands
9	Knowledge bases for initial teacher education in the Netherlands	The Netherlands
10	Center for Professional Learning in Teacher Education (ProTed): Promoting innovation, research strategic partnerships and sharing of best practice in initial teacher education in Norway	Norway
11	Ownership and understanding of the national teacher preparation guidelines in Norway	Norway
12	The role of the Norwegian Agency for Quality Assurance in Education	Norway
13	TeachingWorks: A practice-based approach for preparing teachers in the United States	United States
14	Massachusetts' review and approval of ITE Programmes	United States
15	Cross-state networks for the improvement of teacher education: Deans for Impact	United States
16	ITE programme accreditation in Wales as a means to strengthen research-informed initial teacher education programmes	Wales (United Kingdom)
17	Towards a research-informed, evidence-based reform agenda in initial teacher education in Wales	Wales (United Kingdom)
18	Professional learning based on systematic enquiry in the Fern Federation in Wales	Wales (United Kingdom)

Note: Hyperlinks point to the description of Promising Practices identified in the ITP reviews accessible on the Teacher Ready! platform.

Notes

[1] The OECD Global Video Library of Teaching will be an online platform for knowledge creation and sharing about teaching. Its centrepiece will be short video clips illustrating teaching practices for which a number of outcomes are known and proven. It will provide a window to teachers into authentic classrooms from across the globe and opportunities to actively learn from their peers.

References

AITSL (2015), *Accreditation of Initial Teacher Education Programs: Standards and Procedures*, https://www.aitsl.edu.au/docs/default-source/initial-teacher-education-resources/accreditation-of-ite-programs-in-australia.pdf (accessed on 30 December 2017). [79]

Bain, R. (2012), "Using disciplinary literacy to develop coherence in history teacher education: The clinical rounds project", *The History Teacher*, Vol. 45/4, pp. 513-532, http://www.societyforhistoryeducation.org/pdfs/Bain.pdf (accessed on 13 December 2018). [3]

BERA, B. (2014), *Research and the teaching profession: Building the capacity for a self-improving education system. Final Report of the BERA-RSA Inquiry into the Role of Research in Teacher Education*, British Education Research Association, https://www.bera.ac.uk/wp-content/uploads/2013/12/BERA-RSA-Research-Teaching-Profession-FULL-REPORT-for-web.pdf. [41]

Boyd, D. et al. (2009), "Teacher Preparation and Student Achievement", *Educational Evaluation and Policy Analysis*, Vol. 31/4, pp. 416-440, http://dx.doi.org/10.3102/0162373709353129. [57]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [69]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [10]

Canrinus, E. et al. (2017), "Coherent teacher education programmes: Taking a student perspective", *Journal of Curriculum Studies*, Vol. 49/3, pp. 313-333. [83]

CCSSO (2017), *Transforming Educator Preparation: Lessons Learned from Leading States*, Council of Chief State School Officers, http://www.ccsso.org. (accessed on 5 February 2019). [80]

Clinton, J., R. Aston and J. Quach (2018), *Promoting evidence uptake in schools: A review of the key features of research and evidence institutions*, University of Melbourne, http://dx.doi.org/10.4225/49/5aa61c6c75a9e. [62]

Cochran-Smith, M. and A. Villegas (2015), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20. [53]

Cochran-Smith, M. et al. (2015), "Critiquing teacher preparation research: An overview of the field, part II", *Journal of Teacher Education*, Vol. 66/2, pp. 109-121, https://doi.org/10.1177/0022487114558268. [29]

Cochran-Smith, M. and K. Zeichner (2005), *Studying Teacher Education: The report of the AERA Panel on Research and Teacher Education*, American Educational Research Association, published by Lawrence Erlbaum Associates, https://books.google.fr/books?hl=en&lr=&id=hbiLAgAAQBAJ&oi=fnd&pg=PP1&dq=Studying+Teacher+Education:+The+Report+of+the+AERA+Panel+on+Research+and+Teacher+Education.+Lawrence+Erlbaum+Associates.+&ots=kvcbq8M6DT&sig=hrAHfWD_o5TPEUKJAicby2UxLwE (accessed on 1 October 2018). [51]

Cordingley, P. (2016), "Knowledge and research use in local capacity building", in Burns, T. and F. Köster (eds.), *Governing Education in a Complex World*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-9-en. [48]

Cordingley, P. (2015), "The contribution of research to teachers' professional learning and development", *Oxford Review of Education*, Vol. 41/2, pp. 234-252, http://dx.doi.org/10.1080/03054985.2015.1020105. [66]

Cordingley, P. and M. Bell (2012), *Understanding What Enables High Quality Professional Learning*, CUREE and Pearson School Improvement, http://www.curee.co.uk (accessed on 18 February 2018). [67]

Czerniawski, G., A. Guberman and A. Macphail (2017), "The professional developmental needs of higher education-based teacher educators: an international comparative needs analysis The professional developmental needs of higher education-based teacher educators: an international comparative needs analysis", *European Journal of Teacher Education*, Vol. 40/1, pp. 127-140, http://dx.doi.org/10.1080/02619768.2016.1246528. [37]

Darling-Hammond, L. and A. Lieberman (2012), *Teacher Education Around the World : Changing Policies and Practices*, Routledge, Abingdon, https://www.routledge.com/Teacher-Education-Around-the-World-Changing-Policies-and-Practices/Darling-Hammond-LIEBERMAN/p/book/9780415577014 (accessed on 4 October 2018). [55]

Davey, R. (2013), *The Professional Identity of Teacher Educators: Career on the Cusp?*, Routledge, London and New York. [38]

Davies, H. (2007), "Academic advice to practitioners—the role and use of research-based evidence", *Public Money and Management*, Vol. 27/4, pp. 232-235. [61]

Deeble, M. and T. Vaughan (2018), "An evidence broker for Australian schools", *Centre for Strategic Education*, Vol. 150. [60]

du Plooy, L. et al. (2016), "Searching for research results to inform the design of an initial professional teacher education programme for the foundation phase: A systematic review", *South African Journal of Childhood Education*, Vol. 6/1, pp. 1-8, http://dx.doi.org/10.4102/sajce.v6i1.285. [50]

Dumont, H., D. Istance and F. Benavides (eds.) (2010), *The Nature of Learning: Using Research to Inspire Practice*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264086487-en. [18]

Education Endowment Foundation (n.d.), *Teaching and Learning Toolkit*, https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit (accessed on 11 October 2018). [14]

European Commission (2015), *Shaping career-long perspectives on teaching: A guide on policies to improve initial teacher education*, Education & Training 2020 - Schools Policy, Brussels, http://ec.europa.eu/dgs/education_culture/repository/education/library/reports/initial-teacher-education_en.pdf. [24]

European Commission (2013), *Supporting Teacher Educators for Better Learning Outcomes*, European Commission, Brussels, http://ec.europa.eu/dgs/education_culture/repository/education/policy/school/doc/support-teacher-educators_en.pdf. [30]

European Commission/EACEA/Eurydice, E. (2017), *Support Mechanisms for Evidence-based PolicyMaking in Education (Eurydice Report)*, Publications Office of the European Union. [70]

Fazekas, M. and T. Burns (2012), "Exploring the complex interaction between governance and knowledge in education", http://www.oecd-ilibrary.org/education/exploring-the-complex-interaction-between-governance-and-knowledge-in-education_5k9flcx2l340-en. [11]

Furlong, J. (2015), *Teaching Tomorrow's Teachers.Options for the future of initial teacher education in Wales*, University of Oxford, Oxford, http://gov.wales/docs/dcells/publications/150309-teaching-tomorrows-teachers-final.pdf. [16]

Gansle, K., G. Noell and J. Burns (2012), "Do Student Achievement Outcomes Differ Across Teacher Preparation Programs? An Analysis of Teacher Education in Louisiana", *Journal of Teacher Education*, Vol. 63/5, pp. 304-317, http://dx.doi.org/10.1177/0022487112439894. [58]

González-Sancho, C. and S. Vincent-Lancrin (2016), "Transforming education by using a new generation of information systems", *Policy Futures in Education*, Vol. 14/6, pp. 741-758, http://dx.doi.org/10.1177/1478210316649287. [64]

Greany, T. et al. (2014), *School-University Partnerships: Fulfilling the Potential*, National Co-ordinating Centre for Public Management, https://www.publicengagement.ac.uk/sites/default/files/publication/supi_project_report_final.pdf (accessed on 11 October 2018). [34]

Guerriero, S. (ed.) (2017), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-en. [15]

Guerriero, S. and N. Révai (2017), "Knowledge-based teaching and the evolution of a profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-13-en. [2]

Hargreaves, D. (1996), *Teaching as a Research-based Profession: Possibilities and Prospects*, The Teacher Training Agency, London, https://books.google.fr/books?hl=en&lr=&id=OwWlv3MPnL8C&oi=fnd&pg=PA3&dq=hargreaves+Teaching+as+a+research-based+profession&ots=fhVTJp6DuQ&sig=AYqAPXbH3C-Ws_CoQ_UbPeSc5D8#v=onepage&q=hargreaves%20Teaching%20as%20a%20research-based%20profession&f=false (accessed on 31 October 2017). [17]

Hattie, J. (2008), *Visible Learning : a Synthesis of over 800 Meta-Analyses Relating to Achievement*, Routledge. [13]

Hiebert, J., R. Gallimore and J. Stigler (2002), "A knowledge base for the teaching profession: What would it look like and how can we get one?", *Educational Researcher*, Vol. 31/5, pp. 3-15, http://dx.doi.org/10.3102/0013189X031005003. [23]

Koedel, C. et al. (2015), "Teacher Preparation Programs and Teacher Quality: Are There Real Differences Across Programs", *Education Finance and Policy*, Vol. 10/4, pp. 508-534, http://dx.doi.org/10.1162/edfp_a_00172. [59]

Louisiana Board of Regents (n.d.), *Teacher Preparation Data Dashboards & Fact Book*, https://regents.la.gov/divisions/planning-research-and-academic-affairs/academic-affairs/teacher-education-initiatives/teacher-preparation-data-dashboards-fact-book/ (accessed on 5 February 2019). [78]

Lucas, B., G. Claxton and E. Spencer (2013), "Progression in Student Creativity in School: First Steps Towards New Forms of Formative Assessments", *OECD Education Working Papers*, No. 86, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k4dp59msdwk-en. [27]

Lunenberg, M., F. Korthagen and A. Swennen (2007), "The teacher educator as a role model", *Teaching and Teacher Education*, Vol. 23/5, pp. 586-601, http://dx.doi.org/10.1016/J.TATE.2006.11.001. [28]

MA DESE, M. (2016), *Educator Preparation: Program Approval Criteria List*, http://www.doe.mass.edu/edprep/evaltool/2017CriteriaList.pdf. [75]

MA DESE, M. (2016), *Program Approval Guidelines*, http://www.doe.mass.edu/edprep/ProgramApproval.pdf. [74]

Mandinach, E. and E. Gummer (eds.) (2018), *Building Capacity and Commitment for Data Use in Teacher Education Programs*, Routledge. [73]

Murray, J., A. Swennen and L. Shagrir (2009), "Understanding teacher educators' work and identities", in Swennen, A. and M. van der Klink (eds.), *Becoming a Teacher Educator*, Springer Netherlands, Dordrecht, http://dx.doi.org/10.1007/978-1-4020-8874-2_3. [35]

NASA (2018), *Mars InSight Landing Press Kit*, https://www.jpl.nasa.gov/news/press_kits/insight/landing/download/mars_insight_landing_presskit.pdf (accessed on 29 November 2018). [20]

NBPTS (2019), *National Board for Professional Teaching Standards*, https://www.nbpts.org/ (accessed on 7 February 2019). [44]

NBPTS (n.d.), *National Board for Professional Teaching Standards*, http://accomplishedteacher.org/ (accessed on 7 February 2019). [45]

NCEE (2016), *Empowered Educators: How High-Performing Systems Shape Teaching Quality around the World Australia: Toward a National System*, The National Center on Education and the Economy, Washington, http://ncee.org/wp-content/uploads/2017/02/AustraliaCountryBrief.pdf (accessed on 27 October 2017). [42]

Nusche, D. et al. (2014), *OECD Reviews of Evaluation and Assessment in Education: Netherlands 2014*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264211940-en. [82]

OECD (2018), *Developing Schools as Learning Organisations in Wales*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264307193-en. [40]

OECD (2018), *Education 2030: The Future we Want*, OECD, Paris, http://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf (accessed on 3 October 2018). [26]

OECD (2018), *Innovation Strategy for Education and Training*, http://www.oecd.org/education/ceri/innovationstrategyforeducationandtraining.htm (accessed on 5 December 2018). [63]

OECD (2017), *Empowering and Enabling Teachers to Improve Equity and Outcomes for All*, International Summit on the Teaching Profession, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264273238-en. [1]

OECD (2017), *TALIS 2018 Video Study and Global Video Library on Teaching Practices*, http://www.oecd.org/education/school/TALIS-2018-video-study-brochure-ENG.pdf (accessed on 14 December 2018). [31]

OECD (2014), *Education at a Glance 2014: OECD Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eag-2014-en. [6]

OECD (2014), *TALIS 2013 Results: An International Perspective on Teaching and Learning*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264196261-en. [5]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [43]

OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, OECD Reviews of Tertiary Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264046535-en. [72]

OECD (2007), *Evidence in Education: Linking Research and Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264033672-en. [22]

Paniagua, A. and D. Istance (2018), *Teachers as Designers of Learning Environments: The Importance of Innovative Pedagogies*, Educational Research and Innovation, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264085374-en. [19]

Peck, C., C. Gallucci and T. Sloan (2010), "Negotiating implementation of high-stakes performance assessment policies in teacher education: from compliance to inquiry", *Journal of Teacher Education*, Vol. 61/5, pp. 451-463, http://dx.doi.org/10.1177/0022487109354520. [52]

Révai, N. (2018), "Teachers' knowledge dynamics and innovation in education – Part II", *Neveléstudomány* 1, pp. 6-17, http://dx.doi.org/10.21549/NTNY.21.2018.1.1. [49]

Révai, N. (2018), "What difference do standards make to educating teachers?: A review with case studies on Australia, Estonia and Singapore", *OECD Education Working Papers*, No. 174, OECD Publishing, Paris, https://dx.doi.org/10.1787/f1cb24d5-en. [8]

Révai, N. (2017), "Teachers' knowledge dynamics and innovation in education – Part I", *Neveléstudomány*, Vol. 4, pp. 7-25, http://dx.doi.org/10.21549/NTNY.20.2017.4.1. [47]

Révai, N. and S. Guerriero (2017), "Knowledge dynamics in the teaching profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-4-en. [12]

Rhode Island Department of Education (n.d.), *Rhode Island Educator Preparation Index*, http://www3.ride.ri.gov/RIEdPrepIndex/ (accessed on 5 February 2019). [77]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [84]

Shulman, L. (1987), "Knowledge and teaching: Foundations of the new reform", *Harvard Educational Review*, Vol. 57/1, pp. 1-23, http://dx.doi.org/10.17763/haer.57.1.j463w79r56455411. [4]

Sonmark, K. et al. (2017), "Understanding teachers' pedagogical knowledge: report on an international pilot study", *OECD Education Working Papers*, No. 159, OECD Publishing, Paris, https://dx.doi.org/10.1787/43332ebd-en. [36]

Tatto, M. (2015), "The role of research in the policy and practice of quality teacher education: an international review", *Oxford Review of Education*, Vol. 41/2, pp. 171-201, http://dx.doi.org/10.1080/03054985.2015.1017405. [65]

Tatto, M. et al. (2016), "The emergence of high-stakes accountability policies in teacher preparation: an examination of the U.S. Department of Education's proposed regulations", *Education Policy Analysis Archives*, Vol. 24/0, p. 21, http://dx.doi.org/10.14507/epaa.24.2322. [56]

TEMAG (2014), *Action Now: Classroom Ready Teachers*, Teacher Education Ministerial Advisory Group, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_print.pdf. [7]

TEMAG, T. (2014), *Action Now: Classroom Ready Teachers (Teacher Education Ministerial Advisory Group Final Report)*, Australian Department of Education, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf. [71]

Timperley, H. et al. (2007), *Teacher Professional Learning and Development Best Evidence Synthesis Iteration [BES]*, New Zealand: Ministry of Education, Wellington, http://educationcounts.edcentre.govt.nz/goto/BES (accessed on 11 October 2018). [68]

Toon, D. and B. Jensen (2017), *Teaching our Teachers: a Better Way - Developing Partnerships to Improve Teacher Preparation*, Learning First, Melbourne, http://learningfirst.com/wp-content/uploads/2018/03/2columnsITECoPPaper2PartnershipsFINAL17Nov17.pdf (accessed on 11 October 2018). [33]

Toon, D., B. Jensen and S. Cooper (2017), *Teaching Our Teachers: a Better Way - Continuous Improvement in Teacher Preparation*, Learning First, Melbourne, http://www.learningfirst.com. (accessed on 4 October 2018). [32]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [81]

Welsh Government (2018), *An Introduction to the Professional Standards for Teaching and Leadership*, Welsh Government, https://learning.gov.wales/docs/learningwales/publications/180319-professional-standards-for-teaching-and-leadership-guide-en.pdf (accessed on 7 February 2019). [46]

Welsh Government (2017), *Country Background Report. OECD Initial Teacher Preparation Study. Wales*, Welsh Government. [39]

Welsh Government (2015), *Qualified for Life: A Curriculum for Wales - A Curriculum for Life*, Welsh Government, Cardiff, http://gov.wales/docs/dcells/publications/151021-a-curriculum-for-wales-a-curriculum-for-life-en.pdf. [25]

Welsh government (2017), *Connecting Research and Teacher Education: Quality Enhancement for ITE Partnerships*, Education Directorate, Welsh Government,, http://learning.gov.wales/resources/browse-all/connecting-research-and-teacher-education/?lang=en. [76]

Whitty, G. and J. Furlong (2017), *Knowledge and the study of education : an international exploration*. [9]

Willermark, S. (2017), "Technological Pedagogical and Content Knowledge: A Review of Empirical Studies Published From 2011 to 2016", *Journal of Educational Computing Research*, Vol. 56/3, pp. 315-343, http://dx.doi.org/10.1177/0735633117713114. [21]

Wilson, S., R. Floden and J. Ferrini-Mundy (2001), *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, Center for the Study of Teaching and Policy, Washington DC, https://www.education.uw.edu/ctp/content/teacher-preparation-research-current-knowledge-gaps-and-recommendations (accessed on 4 October 2018). [54]

Chapter 5. How can we provide integrated early professional development for new teachers?

This chapter discusses the challenges countries are facing in providing a coherent support and early professional development system for new teachers. These revolve around three key aspects: overcoming the theory – practice divide, providing support to beginning teachers tailored around their specific needs, and ensuring a smooth transition from ITE to school practice by recognising induction and post-induction periods as critical in becoming professionals. The chapter then proposes some specific strategies including strengthening practical experience in engaging in critical reflection and evaluation of teaching, ensuring effective mentoring schemes with competent mentors, and securing continuity in professional support throughout the early career years. Finally, the last section suggests specific strategies for policy makers, teacher education institutions, and schools and teachers.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The transition from initial training education (ITE) and training institutions to real school environments is the most important stage in the process of becoming a teacher. Even a well-organised ITE cannot compensate for a systematic induction in the first stages of new teachers coping with all the demands of their profession (Valencic Zuljan and Marentic Požarnik, 2014[1]). Attention to practice and field experiences in teacher education has become a key concern and many jurisdictions have undertaken a variety of efforts to make initial training preparation (ITP) more "practice-based" (Jenset, Klette and Hammerness, 2017[2]) in order to:

1. overcome the divide between theory and practice in initial teacher education programmes and promote an integrated professional pathway for teacher candidates
2. provide initial and tailored support to address the particular challenges beginning teachers face – e.g. workload, classroom management, lack of collegial support and knowledge of the school culture – to prevent attrition
3. recognise the first years of the teacher career as a critical stage to both guarantee the implementation in real settings of the knowledge and experience from ITE and the acquisition of new critical professional knowledge and skills.

As a result, during the last 20 years the idea of an "induction phase" where beginning teachers receive a dedicated support has been growingly recognised in OECD countries. However, the existence of a mandatory and quality induction programme providing systemic guidance and personal, social and professional support is far from being the reality in most countries (ETUCE, 2008[3]). Although induction refers to a wide variety of processes by which beginning teachers are supported and introduced into the teaching profession[1], mentoring programmes of new teachers is the most visible, implemented and researched practice (Valencic Zuljan and Marentic Požarnik, 2014[1]).

Overall, the existence of a transitional stage plays a strategic role in the provision of a continuum of teachers' professional growth and development, as represented in the Teacher Education Pathway Model. In order to guarantee a positive and effective induction support, these programmes need to be better integrated into pre-service education and training, and to expand well beyond the very first year of experience in schools.

5.1. Why is this a challenge?

5.1.1. Making the positive effects of pre-service education fieldwork experience last

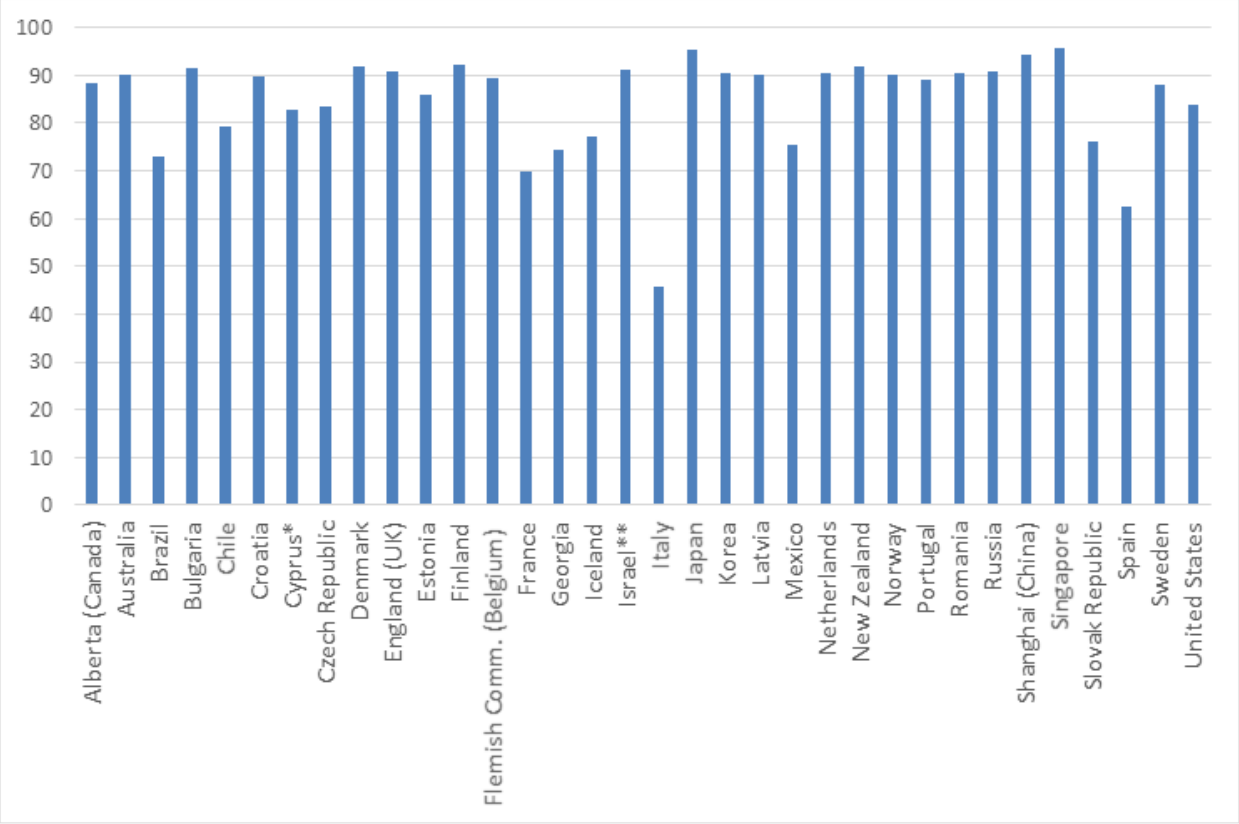
Teacher education has been historically underpinned by divergent views about the relationship between theory and practice in teacher training and learning, and about the nature of the "craft knowledge" or "practical wisdom" that teacher candidates need to work effectively in real classrooms (Burn and Mutton, 2015[4]). In fact, one of the most important studies about the socialisation of teachers to date, the large-scale "Becoming a Teacher" project (Hobson et al., 2009[5]), highlighted in its findings that it is essential to provide beginner teachers with effective strategies for managing workloads and pupil behaviour. Simply said, there is an ongoing need to guarantee a minimum threshold of practical knowledge or experience easily transferable to address the immediate challenges of being in a classroom.

Countries participating in the OECD ITP study reported the lack of integration of practice and theory (Korea, Wales), the limited preparation of candidates for the reality of school cultures (Australia, Norway, the United States) or the inadequacy of training to address practice shock and work overload (Japan, the Netherlands). Rather than exceptional, the shortcomings of ITP systems around the world are still reflected in the persistent difficulties that most early career teachers encounter in schools, and which have largely remained unchanged over the last 50 years (Schuck et al., 2018[6]; Cherubini, 2009[7]).

This difficult relationship between theory and practice in teacher education is well-reflected in the responses of new teachers in the Teaching and Learning International Survey. While 50% of new teachers report that they feel very well-prepared in relation to the content of their subject, only 33% expressed this level of confidence regarding the pedagogy and classroom practice of these subjects (OECD, 2014[8]). Further, well-established concepts in educational sciences and ITE programmes such as personalised learning and instructional alternatives, e.g. collaborative learning, are still rarely seen in classrooms, and show the limited impact of education reforms in ITE on the practices displayed in real settings (Wyss, Kocher and Baer, 2017[9]). As shown in Figure 5.1, although the proportion of teachers in the EU reporting having completed an ITE covering content, pedagogy and practice is relative high – 80% on average -, there are significant differences and several countries display much lower percentages, such as France, Spain or Italy.

Figure 5.1. Theory and Practice in ITE

Percentage of teachers for whom content, pedagogy and classroom practice for some or all subject(s) taught were included in their formal education or training.



Source: OECD (2013[10]), Teaching and Learning International Survey (TALIS): 2013 complete database http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

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The lack of alignment between ITE and induction initiatives can exacerbate the inherent burden that accompanies the transition from training and practice, in sheltered environments, to the challenges of the diverse and changing nature of the classrooms where teachers work. Given the particular complexity of teacher knowledge (Révai and Guerriero, 2017[11]), beginning teachers commonly experience a "transition shock", including being exhausted and finding it difficult to achieve a work/life balance (Newman, 2010[12]). When the difference of expectations between previous experiences in ITE and initial experiences in real school settings are dramatic, new teachers are more likely to experience what has been reported as "reality shock" (Gaede, 1978[13]; Dicke

et al., 2015[14]), "practice shock" or "cultural shock". Some of the key challenges beginning teachers have to address include: to understand and adapt to the specific school(s) context and culture where they start their careers; to learn how to navigate the traditions and particular "staffroom politics"; and to negotiate divergent views about the most appropriate teaching methodology. Further, they have to learn quickly how to manage conflicts between personal perceptions and public expectations, or how to make sense of the idiosyncratic practices derived from their colleagues' experience (Schatz-Oppenheimer and Dvir, 2014[15]; White and Moss, 2003[16]; Rots, Kelchtermans and Aelterman, 2012[17]). Consequently, finding ways to cope effectively with stress and workload continues to be strongly based on experience rather than effective preparation, which in turn makes new teachers more exposed to emotional exhaustion and burnout.

When teacher candidates' opportunities to learn in grounded practice differ from the realities of schools or induction programmes, they try to adopt "survival strategies" rather than consolidate their teaching skills with knowledge obtained at the faculty (Valencic Zuljan and Marentic Požarnik, 2014[1]). That is to say, even when ITP programmes focus on offering strong and coherent programmes grounded in practice (Jenset, Klette and Hammerness, 2017[2]), these positive experiences risk to become "overwritten" or by-passed by other personal, ad-hoc experiences of expert teachers that might or might not be based on educational sciences. In real classroom situations, beginning teachers do not have time to research their problems or to develop reflective skills quickly and effectively enough.

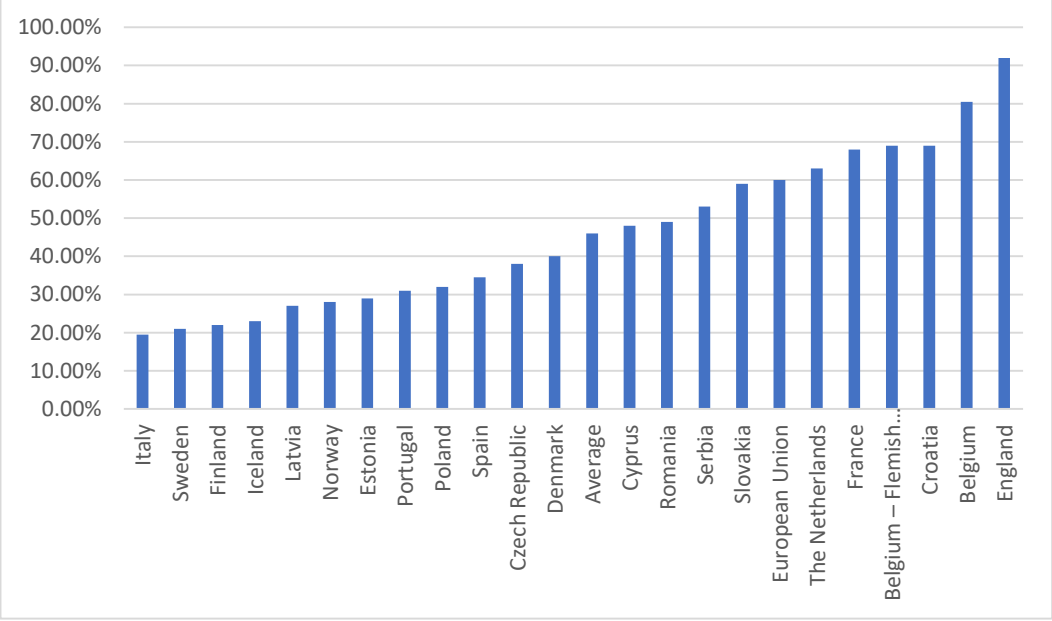
In order to make the positive effects of pre-service fieldwork experience last, the transition to in-service teaching should offer beginning teachers support to creatively overcome challenging situations by implementing previous skills and knowledge, ideally with the help of a dedicated and experienced mentor. When perceived problems are numerous and intense, teachers concentrate more on these "survival strategies" and approach instruction and the maintenance of order in the classroom as a way to protect their own physical and mental well-being (Woods, 1977[18]; Donche, Endedijk and Daal, 2015[19]), rather than try to become autonomous, creative and innovative professionals.

Despite the lack of sounding and definitive evidence of the impact of induction initiatives, there has been a growing research identifying and reporting some good practices and benefits (European Commission, 2010[20]; Hobson et al., 2009[21]; Picard and Ria, 2011[22]; Fransson and Gustafsson, 2008[23]). For example, Hobson et al. (2009[21]) review of evidence reported the way in which mentoring can reduce the isolation of beginning teachers, and also increase their confidence and self-esteem. Mentoring is not the only way in which new teachers can enhance their opportunities to reflect on their practices and connect. For example, Cochran-Smith et al. (2015[24]) describe how, even through online meetings, new teachers can connect and interact with other teachers to express their decision and clarify their views. Other research has pointed to the professional growth and improved self-reflection and problem-solving skills of teachers receiving mentoring (Franke and Dahlgren, 1996[25]; Ingersoll and Strong, 2011[26]). In order for these mentoring and induction initiatives to work effectively, it is critical that ITE providers are aligned with schools in terms of purposes and content of teacher education. When ITE content collides with the practice of schools – for example, because ITE focuses mainly on knowledge and academic content rather than providing professional and practice-based skills – this may result in conflicts that, in turn, might undermine these partnerships (Hunt, 2014[27]). The nature and purpose of mentors is therefore strongly influenced by the extent to which ITE prepares teacher candidates for day one and teaches them to become lifelong learners.

5.1.2. Creating strong induction initiatives: the case of mentoring programmes

Mentoring is far from being universally available for teachers. On average, across the OECD countries, one out of four lower secondary teachers teach in a school whose principal reported having no access to a mentoring system in the school. In some countries such as Chile, Finland, Mexico or Portugal, the percentage is much higher, over 60% (OECD, 2014[8]). As shown in Figure 5.2, more support is available in the European Union (EU), but still, in many of the EU countries only 60% or less of lower secondary teachers participate in formal induction programmes.

Figure 5.2. Proportion of early career teachers in lower secondary education who took part in formal induction programmes



Source: European Commission (2015[28]), *The Teaching Profession in Europe: Practices, Perceptions, and Policies*, European Commission, https://eacea.ec.europa.eu/national-policies/eurydice/content/teaching-profession-europe-practices-perceptions-and-policies_en (accessed on 26 September 2018).

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One of the main challenges to scale up and sustain mentoring schemes is attracting experienced teachers and training them to become effective mentors. All the countries taking part in the ITP study stated that mentor teachers lack guidance and training or certification. In some cases, countries acknowledged that mentors did not have enough experience as teachers. For example, roughly two thirds of the teachers being mentored in OECD countries had a mentor in their subject field of expertise (OECD, 2014[8]). As

highlighted in most of the participating countries in the ITP study, trained mentors face a heavy teacher workload that poses a significant burden to find time for mentoring. Finally, the lack of recognition in the form of clear incentives or career paths is an important barrier to improving the quality assurance of mentoring.

Regardless of claims in the literature of the importance of the preparation of mentors, their status and training continues to be an under-researched field in education (Aspfors and Fransson, 2015[29]). For example, it is still important to reflect upon how and why mentoring in the induction phase differs from the mentoring of teacher candidates during their in-school placements (Aspfors and Fransson, 2015[29]), or how to identify potential candidates, for having experience does not guarantee expertise: teachers also need to be competent at mentoring (Wang and Odell, 2007[30]).

Another important challenge lays in the nature of the mentoring programme itself. Different approaches to mentoring may elicit different kinds of learning and develop different kinds of dispositions and actions in mentees. Kemmis et al. (2014[31]) argue that mentoring may include support, and/or supervision, and/or collaborative self-development. On the other hand, Fransson and Gustafsson (2008[23]) discuss the need to balance the role of evaluation and of the promotion of professional development in these initiatives to avoid conflicting goals – or if induction should encourage new teachers to question existing teaching practices or rather be concerned with instrumental and managerial outcomes (Simmie et al., 2017[32]). Of special interest are potential dangers of "judgementoring" in school-based mentoring (Hobson and Malderez, 2013[33]). If the goal of mentoring is to support beginning teachers to become "reflective practitioners"' by offering scaffolding and encouraging their participation, the tendency of mentors to reveal too readily and/or too often their own judgments or evaluations of mentees planning, fails to create the necessary safe and trusting relationship that must permeate mentoring. Moreover, these pitfalls are likely to happen when mentors are forced to become mentors, when they do not receive appropriate training or when they are both in charge of assessing and supporting them – two conflicting agendas (Hobson and Malderez, 2013[33])

An additional problem is the context-related nature of successful mentoring initiatives. In this sense, without a form of quality assurance and systematisation to identify and replicate successful experiences, policy initiatives formulated at a system level do not always work well at the school level (Schuck et al., 2018[6]). There is still a need to continue building from the experiences of schools where previous early career teachers have reported positive experiences (Allen, 2009[34]). At the same time, it is also important to produce more small scale, in-depth qualitative studies to better understand these processes, as these are still scarce (Simmie et al., 2017[32]).

5.1.3. Situating induction within early professional development and ensuring transition to continuous learning

Many of the challenges new teachers cope with are not exclusive of the initial years of the career but are illustrative of the teaching profession (Paniagua and Sánchez-Martí, 2018[35]). For example, Caspersen and Raaen (2014[36]) describe a limited difference in the way novice and experienced teachers cope with teaching, and also small variance between their sense of self-efficacy. Further, in their study on the nature of burnout among teachers, Høigaard, Giske and Sundsli (2012[37]) argue that teachers' stress is not a short-lived problem and cannot be circumscribed to a phenomenon taking place in the early stages of the profession. Although it is commonly suggested that early career

teachers seemingly go through differentiated stages – e.g. anticipation, survival, disillusionment, rejuvenation and reflection (Moir, 1999[38]); cited in (Keogh et al., 2012[39]), teacher pathways are likely to repeat these stages at different points of the career, especially if teachers are confronted with new contexts and challenges (Paniagua and Sánchez-Martí, 2018[35]). It is in this sense that, to an extent, continuous professional development programmes can be seen as linked to some areas and goals of induction programmes.

Highlighting the similarities of new and experienced teachers' needs is not intended to denaturalise the importance and particular characteristics of the "induction phase" of beginning teachers. Rather, the policy challenge is that post-induction transition is a particular area where research is scarce, and there is a growing need to identify strategies to facilitate early career teachers' integration into school communities (Fenwick and Weir, 2010[40]), and avoid framing induction as a stand-alone, fragmented practice. This need derives its significance from the fact that mentoring programmes should ideally extend beyond the common duration of induction programmes, for mentoring involves a relationship that ranges from one to three years (Spooner-Lane, 2017[41]). Many of the implications for facilitating provision of support to beginning teachers outlined by Hobson (2009[42]), such as ensuring that teachers are not solely dependent upon the support of individual mentors or providing access to peer support network, cannot simply be conceived as one-off initiatives lasting less than a year. In fact, this author explicitly emphasises that induction programmes should "ensure that provision is in place beyond the first year of teaching for appropriate forms of continuous professional development for beginner teachers" (Hobson, p. 314[42]).

The conceptualisation of induction as a form of early professional development – years 2-6 of a teacher's career (Fenwick and Weir, 2010[40]) – is derived from the growing need among researchers, educators and policy makers of approaching schools as learning organisations, that can better adapt to changing environments, embrace innovations and address new learning goals (Kools and Stoll, 2017[43]). The design and introduction of new curricula, practices and organisational forms in schools require that newcomers are provided with invaluable assistance not only to "survive" their first classroom experiences but also to build a context-related form of professional development, which in turn is very valuable for schools. As discussed by Paniagua and Istance (2018[44]), schools that are promoting innovations or that have developed a distinctive pedagogical approach often find it challenging to include beginning teachers that are not familiar with their pedagogical or organisational model. At the same time, early career teachers bring with them enthusiasm and recent training that can be potentially valuable for schools to innovate and reflect on their own practices. In other words, developing a culture of enquiry, innovation and exploration, and promoting team learning are processes that are on going in that they always benefit from new contributions, in which beginning teachers should engage from the very beginning.

However, this need for career progression from the induction phase is challenged by the instability and fragmentation of the initial teaching career paths in many countries. It is common that teachers will spend their early years of teaching in a series of temporary positions, in a variety of schools – which are likely to be the most challenging – and therefore they do not have the possibility to know the particular school culture or to establish supportive professional relationships (Paniagua and Sánchez-Martí, 2018[35]). As suggested by Fenwick and Weir (2010[40]), the uncertainty associated with post-induction experience along with temporary status, creates a de-motivating effect and sense of

isolation that precludes the potentials of beginning teachers to be involved and impact the school where they work.

5.2. What strategies can address the challenge?

5.2.1. Offering extensive opportunities for teacher learning grounded in practice

The goal of creating a continuum of teacher professional development strongly resonates with the need of building a continuum of the fieldwork experiences of teacher candidates and beginning teachers. A growing body of research has suggested that efforts in preparing teachers more closely for practice can have an impact on student learning and increase teacher retention (Jenset, Klette and Hammerness, 2017[2]). Internationally, strategies include extending the practicum or field placement for prospective teachers, placing teachers in school residencies, or create strong partnerships between universities and schools that are focused on new teachers' learning (Hunt, 2014[27]; Pedaste et al., 2014[45]; Lane, Lacefield-Parachini and Isken, 2003[46]). Further, Mattsson, Eliertsen and Rorrison (2011[47]) describe other practices such as involving pre-service teachers in school development projects, integrated models of pedagogy in practicum, or enhancing reflection on practices in relation to theories – i.e. clinical practice.

The main challenge reported by Burn and Mutton (2015[4]) is that addressing the gap between theory and practice is not simply a result of increasing in classroom "field experiences" or operating 'partnership' models between university and schools. Rather, the goal is to allow beginning teachers not only to have opportunities to practice and refine teaching skills or witness "judgement in action", but also to engage in creative and critical reflection and evaluation of teaching and learning models. When critical reflections of "field experiences" draw on research evidence, and student data, and explicitly address the key role of experience in context, teacher learning is said to be more "grounded in practice", as illustrated in Table 5.1.

Table 5.1. Opportunities Grounded in Practice in Teacher Education

Opportunities to:

	Description of dimension
1. Plan for teaching and teacher role(s)	The extent to which candidates have opportunities in the class to plan lessons or units, to develop instructional materials and resources, etc.
2. Practice of rehearse teacher role(s)	The extent to which candidates have opportunities in the class period to practice, rehearse, or approximate elements of practice (e.g. practice leading a whole-class or small-group discussion)
3. Analyse pupils' learning	The extent to which candidates have opportunities to analyse pupils' learning (e.g. to analyse K-12 pupil work, to view classroom transcripts or videos, and analyse pupils' learning)
4. Include teaching materials, artefacts, and resources	The extent to which candidates have opportunities to use, discuss, or analyse artefacts or resources from real classrooms and teaching (e.g. video of teachers or samples of real K-12 pupil work)
5. Talk about field placement/ student teaching experiences	The extent to which candidates have opportunities to discuss or relate what they are discussing or doing in class to their own fieldwork or student-teaching (e.g. bring in their own pupils' work)
6. Take pupils' perspective	The extent to which candidates have opportunities to do work that their pupils will or might do (e.g. candidates read texts their pupils will read)
7. See models of teaching	The extent to which candidates have opportunities to see their teacher educators explicitly modelling the kinds of practices discussed in class (e.g. instructors model group work or giving good feedback)
8. See connection to national or state curriculum	The extent to which candidates have opportunities to read, review, critique, or analyse materials or resources specific to the national, state, or local context (e.g. to analyse national, state, or local curriculum, etc.)

Source: Jenset, I., K. Klette and K. Hammerness (2017[2]), Grounding Teacher Education in Practice Around the World: An Examination of Teacher Education Coursework in Teacher Education Programs in Finland, Norway, and the United Sates", *Journal of Teacher Education*, Vol. 69/2, pp. 184-197, http://dx.doi.org/10.1177/0022487117728248.

However, even if ITE programmes improve these opportunities grounded in practice or provide further integrated models of theory and practice, if these experiences are too disconnected with the real contexts of practice where beginning teachers start their careers, the valour risks to be reinterpreted as "false practice" – i.e. theory. For example, it is not uncommon that teacher candidates engage with their first experiences in exemplary or less challenging schools, whereas new teachers are more likely to be allocated to disadvantaged schools on their first jobs. Similarly, these "practices" should reflect to some extent either the realities of teaching in schools or demonstrate how new teachers can build on these to improve and innovate teaching.

Therefore, instead of focusing on the type of contexts – e.g. elite vs. challenging schools – these grounded practices should take place in schools that provide a sheltered environment with a strong culture of professional learning, where prospective teachers can practice and develop their teaching skills. Ideally, teacher education institutions should work with a diverse set of schools that are learning organisations regardless of how challenging these environments are. Tailored mentoring schemes for very particular contexts can also be an important strategy to improve the readiness of new teachers and address certain sources of teacher shortages (see Box 5.1)

5.2.2. Building on the experience of effective induction and mentoring programmes

Mentoring programmes are the spearhead of the organisation of induction for beginning teachers and there has been growing research identifying good practices and indicators to guarantee the quality delivery of mentoring (Rockoff, 2008[48]; European Commission, 2010[20]; Hobson et al., 2009[21]; Kraft, Blazar and Hogan, 2018[49]; Schuck et al., 2018[6]). In their review of induction and early-career support of beginning teachers, Zuljan and

Požarnik describe a number of key conditions to ensure the success of induction initiatives:

1. Financial support (reduced workload of novice teachers without reducing their salaries, reduced teaching workload of mentors to allow time for mentoring).
2. Clarity about roles and responsibilities (of novice teachers, mentors, head teachers, teacher educators, ministries and/or local authorities, unions/ professional bodies/ steering boards).
3. Cooperation between different parts of the system (induction as part of a continuum: building on initial teacher education and feeding into continuing professional development).
4. Quality management (the competence of mentors, the competence of school leaders, monitoring and evaluation of induction policies).
5. A culture focused on school as a learning community in which all the participants can benefit from mutual professional development (2014, p. 201[1])

For the design and implementation of induction programmes, the European Commission (2010[20]) also advises policy makers to consider the explicit policy aims of each initiative, for different countries might have different priorities – e.g. reducing the drop-out rate of beginning teachers or providing feedback for initial teacher education. A second main consideration lies in ensuring that induction is delivered as a coherent programme addressing three kinds of support: personal/emotional, social and professional. In order to fulfil this support, four main interlocked systems are identified: systems for mentoring, expert inputs, peer support and self-reflection (Table 5.2.)

Addressing the lack of research on training effective mentors is another key policy issue that would allow for building the capacity of experienced teachers to become mentors and enhance the evidence-base on effective mentoring (Simmie et al., 2017[32]; Spooner-Lane, 2017[41]).

Table 5.2. A comprehensive model for induction programmes

	Mentor	Expert	Peer	Self-reflection
Support Provided	• professional • personal • social	• professional	• professional • personal • social	• professional • personal
Aims	• stimulate professional learning • create safe environment for learning • socialisation into school community	• ensure beginning teacher's professional development • expand content knowledge and teaching competences	• create safe environment for learning • share responses to common challenges	• promote meta -reflection on own learning • promote professionalism • develop attitude of lifelong learning • link ITE and CPD
Key Actors	• experienced, suitably trained teacher(s)	experts in teaching (e.g. from teacher education institutions)	• other new teachers • experienced teachers • other colleagues	• beginning teacher
Activities	• coaching • training • discussion • counselling • coordinating school level arrangements	• seminars • various courses • support materials • resources • guidelines	• networking in and between schools • face-to-face meetings (can be aided by a virtual community) • team-teaching • collegial feedback	• observation of and feedback on teaching • peer review • system to record experiences, learning and reflections, e.g. portfolios, diaries
Conditions for success	• careful matching of mentors and student teachers • mentors must share and support vision, structure of induction programme etc. • co-ordination in school • facilitation of mentors tasks (e.g. workload) • training for mentors	• easy access to external expertise and advice • non-judgemental approach	• reduced workload to allow time for cooperation and sharing	• reduced workload to allow time for reflection • established standards against which performance can be self-assessed

Note: In the expert system, the focus is on creating access to external expertise and advice in order to expand content and teaching. The peer system brings beginning teachers together, thus creating opportunities to network within and across schools. Self-reflection ensures the continuation of study and of personal growth, allowing for a bridge between ITE and CPD at the level of personal investment.
Source: European Commission (2010[20]), *Developing coherent and system-wide induction programmes for beginning teachers: a handbook for policymakers*.

5.2.3. Embedding new teachers' early development in a culture of continuous professional learning

The common indicator of well-developed systems for teacher development is that they truly work as systems, with multiple and coherent components ranging from recruiting to professional development in schools (Darling-Hammond, 2017[50]). Similarly, the conceptual framework of the ITP study proposes a continuum of four consecutive stages that are meant to be well-connected and aligned. If one key insight underpinning the idea of ITP is to ease the divide between pre-service preparation and in-service work, then the systemic approach inscribed in the conceptualisation of ITP systems must also link other divides in the preparation of teachers – e.g. induction vs. post-induction – and go beyond the first two years of teaching experience. In fact, according to research on mentoring, this support should be treated as a three to five year process, thus going clearly beyond the common usages and conceptualisations of the "induction" phase (Spooner-Lane, 2017[41]; Fenwick and Weir, 2010[40]).

While teacher policies had placed a great interest on how to guarantee the necessary teacher workforce, there has been an increasing attention to the need to prepare new

teachers to become change agents in order to help schools improve the engagement of learners and address persistent educational gaps (Pettersson and Molstad, 2016[51]). In many systems, teachers are now not simply expected to follow a set of standardised practices but to play an active role in the design of learning environments (Schleicher, 2011[52]). In practice, this leaves ITP systems with the challenge of preparing new teachers to become at the same time good professionals with the capacity to help schools to innovate. This apparent contradiction – i.e. is experience a prerequisite for innovation, or rather is it through the process of innovation and enquiry that meaningful teacher experiences are developed – becomes blurred when considering innovative skills a core part of teacher professionalism (Paniagua and Sánchez-Martí, 2018[35]). When formal induction and long-term support programmes are permeated with an integrated professional culture –i.e. learning organisations – (Kardos et al., 2001[53]), schools are able to move beyond "assisting" new teachers and engage them in their professional culture of teaching.

5.3. How can the different actors apply these strategies?

5.3.1. What can policy makers do?

Promoting frameworks with integrated subjects that help address the gap between theory and practice

In order to effectively ground teacher education in practice, subject content, theory and subject pedagogy must be taught in an integrated way. For this to happen, it is not enough to increase the hours of practice that teacher candidates spend in classrooms or the number of "practice-based" subjects in teacher education programmes. Offering integrated subjects instead of isolated ones has a stronger potential to ease rather than deepen the theory/practice divide.

The Norwegian Ministry of Education promotes "professional subjects" (Table 5.3/11) in its National Qualification Framework (NQF) and guidelines for initial teacher education. These require ITP providers to develop programmes that combine academic knowledge, subject didactics, the pedagogy underlying them. Professional subjects also need to build on research-based evidence to sustain teaching practices combining knowledge in learning theories.

Encouraging university-school partnerships through specific targeted funding schemes to align the classroom experiences of teacher candidates and new teachers

Policy makers can monitor and identify schools facing shortages of teachers and establish pre-employment training immediately before new teachers enter the classroom, followed by a dedicated mentoring programme in these schools. The Gyeonggi's pre-employment approach in Korea (Table 5.3/8) shows the effectiveness of such initiatives for addressing the immediate needs of new teachers and enhance the opportunities for grounded practices. More generally, governments can allocate special funding for universities and schools, so that they can create unified pathways enabling teacher candidates to ground their experience in the same schools where they will be hired upon graduation, like the University of Tasmania internship model (Box 5.1, Table 5.3/1).

Positioning mentoring as a key quality lever and guaranteeing that mentoring is rigorous and fully available for most if not all beginning teachers

Mentoring schemes can become strong avenues for supporting beginning teachers if they are carefully planned and implemented. Central authorities can allocate financial support and promote standards for mentoring as a first step in this regard. Across countries participating in the ITP study, some strong initiatives were identified acknowledging the importance of induction that mobilised a significant amount of resources. In Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) provides guidelines for the 1-year induction period for new teachers, involving 120 hours of in-school training (Table 5.3/5). In Australia, support for teachers in the early years of their career is available in many forms, and induction programmes can be found in all the states and territories. Recent efforts include the development of national guidelines for induction into the profession and diverse tailored initiatives (see Box 3.3 in Chapter 3), Table 5.3/2) to guarantee the provision of new teachers according to the needs of rural and challenging schools.

In the United States, 29 states require support for beginning teachers, of which 15 require support beyond the first year of teaching. In California, beginning teachers must take a 2-year programme called Beginning Teacher Support and Assessment (BTSA). One of the most salient initiatives are the teacher residencies, such as those provided by Inspired Teaching in Washington (Table 5.3/13). Teacher residencies last an average of 1 year and improve the clinical experience of teacher candidates, providing stronger links between ITE, induction and continuous professional development. In Norway, the Ministry of Education and Research and the Norwegian Association of Local and Regional Authorities (KS) work together to ensure that all beginning teachers can access mentoring programmes. For 2014, 72% of beginning teachers reported that their schools had a mentoring scheme (Norwegian Ministry of Education and Research, 2016[54])

Providing more stability in new teachers' assignments so that mentoring programmes can become a form of on-going support

Policy makers need to envisage strong mentoring programmes that move beyond addressing urgent needs associated to the very first teaching experiences. Extending support for the initial stages of teaching and explicitly linking induction with ongoing professional development can ensure a continuing development of skills that require more experience to master. This, in turn, requires policy makers to encourage, to the extent possible, some degree of stability in the assignments of new teachers to schools. Promising practices that guarantee the stability of new teachers include replacement pools where new teachers are permanently assigned to one school. This means that when they do not have an assignment as a substitute, they stay in that school, which allows them to extend their experience and develop collegiality in a professional community (OECD, 2005[55]). Other initiatives include ITP schemes where training takes place in schools that upon graduation will hire these teacher candidates, as it is the case of the University of Tasmania internship model (Box 5.1, Table 5.3/1).

Advancing large-scale improvement reforms targeting comprehensive models of team work, enquiry and collective learning

Structured teaching experiences in schools provide a platform for teacher candidates to improve their inquiry and reflective skills. Fostering the degree of collegiality in schools is important to foster the guidance and support of experienced teachers towards new

teachers. A good example of how the commitment of governments can promote integrated models of support for new teachers comes from the Welsh Government. In their last action plan for 2017-21, entitled "Education in Wales: Our National Mission", there is an explicit call to develop schools as learning organisations (Box 5.3). This model includes the promotion of mentoring, continuous professional development and a culture of enquiry, exploration and innovation. This is well-aligned with the goal of integrating induction and post-induction phases for new teachers, while offering them opportunities to participate and the support they need. In the same spirit, in Japan, the Ministry of Education encourages schools to use a co-ordinated comprehensive and collaborative approach to training new teachers (Table 5.3/6).

Box 5.1. University of Tasmania internship model

Across the eight states and territories in Australia, recent graduates of initial teacher education (ITE) programmes commonly experience challenges securing permanent employment as full-time teachers. Currently, a relatively low number of recent graduates obtain full-time employment upon graduation. Further, teachers who do secure such an employment commonly experience a disconnection between their teacher education and their new professional demands. This can be the result of a sharp increase in job expectations, including the expectation that new teachers will be fully independent, and the challenge of applying theory to practice.

To address teacher shortages, the Tasmanian Department of Education in Australia partnered with the University of Tasmania to create the Teacher Intern Placement Program to better connect teacher preparation and hiring. The programme aims to identify, attract and retain teacher candidates into priority teaching areas and locations as identified by the department. It offers prospective teachers a full-time (35 hours/week) internship in a local classroom during the final year of their ITE programme, with the promise of being hired and to have school-based mentoring in that same school the following year upon graduation (Table 5.3/1).

5.3.2. What can teacher education institutions do?

Exploring further mechanisms to smooth the transition from the fieldwork experiences offered in ITE programmes and the induction initiatives offered in schools

Schools serving diverse communities with higher proportions of families from low socio-economic backgrounds commonly face unique challenges that ITE programmes might find difficult to address. Creating specialised programmes to equip teachers for particular challenging contexts, along other incentives such as stability, has the potential to not only prepare but also attract teachers to these schools.

For example, in Australia, the Queensland University of Technology originally developed the National Exceptional Teachers for Disadvantaged Schools (NETDS) initiative and, after ten years, this programme is now implemented in seven other universities in other states. This academic model offers a tailored learning model preparing teacher candidates for working in disadvantaged schools, including a mentoring scheme (Table 5.3/3).

Advancing new ways to bridge the so-called "university-school divide" and designing new ITE programmes that then can spread to other ITP providers

Universities and organisations providing ITP programmes are in a privileged position to promote new ways of designing fieldwork experiences. In particular, if ITP providers welcome the contribution of schools and teachers and implement a co-design approach, they can further develop integrated models and better address the context where teacher candidates will start their careers. Well-monitored pilot programmes can serve as a platform for national authorities to support and scale strong induction programmes.

A powerful case with a significant track record is the Clinical Faculty model created by diverse universities in the U.S during the 1980s and 1990s (Box 5.2, Table 5.3/14). Clinical approaches to ITP represent one of the most important ways in which ITP systems are integrating theory and practice, and create a stronger link between preparation, induction and ongoing professional development.

In the Netherlands, the University of Groningen initiated a 3-year induction period for all new teachers that may be considered by the Ministry for scaling up (Brouwer et al., 2016[56]). In Australia, the ITP review identified several models of clinical practice successfully integrating practice and research into ITE programmes by immersing students in the work and culture of schools Table 5.3/4).

Providing specific guidance and training to schools in the development and implementation of induction programmes

In the Netherlands, ITP institutes support schools in the development and implementation of induction programmes through the national project "supporting beginning teachers", which aims to address the shortage of available mentoring for new teachers. More generally, ITP institutions need to tap into existing research gaps regarding the impact of different induction programmes and new induction models and training pathways for prospective mentors. As mentioned, the residency and clinical approaches advanced by universities in the United States illustrate the role ITP institutions can play in improving or supporting induction programmes. The recently created Centre for Professional Learning in Teacher Education (ProTed) in Norway has focused, among other actions, on innovating in the training of teacher educators (see Box 2.1. in Chapter 2 and Table 5.3/12). Similar efforts from universities should include the area of mentors, teacher educator-and-mentor partnerships or the relationship between mentors and supervisors of the fieldwork experiences of students to guarantee the continuity and coherence of experiences.

Box 5.2. Clinical Faculty Model

Clinical practice in education conveys the necessity of bringing research based understandings of teaching and learning into dialogue with the professional understandings of experienced teachers. It is conceived along two main goals:

- To facilitate and deepen the interplay between the different sources of knowledge that are produced in different contexts, i.e. school and university.
- To provide scope for beginning teachers to reflect critically these different types of knowledge in relation to each other, aiming at interpreting and adapting that knowledge with their particular classroom experiences.

Clinical practice in ITP is built on the premise that in order to be granted full access to real classroom, teacher candidates must complete rigorous academic and practical training. This includes: working effectively with clients, securing an amount of scientific knowledge, understanding how to use evidence and judgement in practice, and comprehending and readapting according to the standards of practice of their respective teacher communities.

Source: Burn and Mutton (2015[4]), "A review of 'research-informed clinical practice' in Initial Teacher Education", *Oxford Review of Education*, 41, 2, pp. 217-233.

5.3.3. What can schools and teachers do?

Creating and sustaining effective and deep partnerships with universities to co-design ITE programmes, in-school fieldwork experiences for teacher candidates and induction or mentoring schemes for new teachers

The alignment between students, mentors, teacher educators and school leaders can be viable only if schools are eager to cooperate and work collaboratively with other stakeholders. Norway, for example, has converted teacher training degrees to Master's programmes that requires trainee teachers to conduct a school-based research project as part of their thesis. The importance of the role of schools is one of the factors explaining the successful partnerships taking place in the Netherlands to enable a good balance of theory and practice, and for developing a continuum of skills to guide development of ITE into induction (Table 5.3/10). Moreover, the Dutch government funds and accredits partnerships where teacher candidates spend two days per week in a partner school, courses are co-designed and delivered by university and school staff, and academics and school teachers work in partnership on research projects.

Affiliated schools in Japan provide another case of strong university-schools partnerships (Table 5.3/7). Indeed, 258 affiliated schools provide in-site innovative teaching experiences for teacher candidates, and conduct research in cooperation with the university. These partnerships between universities and schools should aim to include strategic issues such as working collaboratively to identify key competences for mentors, how to train experienced teachers to become mentors, or strengthen the collaboration between school mentors and teacher educators.

Conceiving induction as an integrated, systemic model of support where principals, experienced teachers, and early career teachers are eager to address the different needs of new teachers

In order to guarantee the successful implementation of induction programmes, school leaders and their staff should work together to build a welcoming and supportive environment in their schools. If the goal is to address the emotional, social, and professional needs of novice teachers, then schools need to view induction as something more than an isolated action involving just a mentor and a mentee. Since mentoring is anchored in the particular context and community of practice, schools should not expect that top-down initiatives per se can guarantee the enactment of powerful school-based induction programmes. Financial support and encouragement from central bodies are the basis, but the development of a culture focused on a community where all teachers can benefit from mutual professional development requires schools to have a strong role in claying the responsibilities and competences of mentors and other professionals. The conceptualisation of schools as learning organisations (SLO) offers an integrated model of enquiry and professional development that places the creation and support of all professionals at the centre (Box 5.3, Table 5.3/15).

Launching collaborative networks to provide opportunities for early professional development for new teachers

Promoting induction initiatives that are particularly suited to address certain schools' needs can also be a form of investment to retain new teachers beyond the induction period. For those schools that are consciously engaging with innovation, that have developed a distinctive approach, or have difficulties to attract teachers given their particular context (e.g. rural or challenging schools), a collaborative design of early professional development is particularly interesting. Teachers that are part of school networks are continuously in contact with a large community of practice and structures that support their professional development. These structures include meetings for sharing experiences and reflecting on new practices.

In Korea, individual teachers organise "Study Groups and Professional Learning Communities" to support strategic innovation, including the introduction of new teachers to the community and induct them into the culture of collaborative study and innovation (Table 5.3/9). These groups can have an impact in helping schools move towards horizontal cultures more open to innovation and change. Within this approach, support to new teachers is systematically integrated into creating and supporting continuous learning opportunities for all teachers.

Box 5.3. Schools as learning organisations in Wales

The strategic education plan, *Education in Wales: Our National Mission (2017–2021)*, presents Wales' national vision for education building in four key enabling objectives:

1. developing a high-quality education profession
2. inspirational leaders working collaboratively to raise standards
3. strong and inclusive schools committed to excellence, equity and well-being
4. robust assessment, evaluation and accountability arrangements supporting a self-improving system.

The Welsh Government considers the development of SLOs as vital for realising these four objectives and supporting schools to put the new curriculum into practice. As a growing research suggests, SLOs react more quickly to changes, improve job satisfaction, enhance experimentation and are also associated positively with student outcomes (Kools and Stoll, 2017[43]). In particular, the SLO model of Wales focuses its efforts on the seven dimensions proposed by the OECD guidelines for making schools a learning organisation.

Source: OECD (2016[57]), *What makes a school a learning organisation? A guide for policy makers, school leaders and teachers,* OECD Publishing, Paris.

Table 5.3. Practices to ensure an evidence-informed, self-improving ITP system

Reference number	Title of practice	Country
1	Creating a pipeline to teaching in Tasmanian government schools: From the university to hire	Australia
2	Recruiting highly qualified mature STEAM graduates to teaching in Australia	Australia
3	The National Exceptional Teachers for Disadvantaged Schools Initiative in Australia	Australia
4	Clinical practice approaches in initial teacher education in Australia	Australia
5	Mandatory 1-year induction for new teachers in Japan	Japan
6	The use of lesson study to develop teachers in Japan	Japan
7	Collaboration between and within universities, boards of education and schools in Japan	Japan
8	Pre-employment training for new teachers in Gyeong-gi Province in Korea	Korea
9	Professional learning communities and master teacher networks: Building collective responsibility for the profession and for supporting new teachers	Korea
10	Schools and teacher education institutions co-creating ITE programmes in the Netherlands	Netherlands
11	Integrating knowledge and practice in teacher education in Norway	Norway
12	Centre for Professional Learning in Teacher Education (ProTed): Promoting innovation, research strategic partnerships and sharing of best practice in initial teacher education in Norway	Norway
13	Teacher residencies featuring the Centre for Inspired Teaching	United States
14	Clinical faculty in the United States	United States
15	Towards a research-informed, evidence-based reform agenda in initial teacher education in Wales	Wales (United Kingdom)

Note: Hyperlinks point to the description of Promising Practices identified in the ITP reviews accessible on the Teacher Ready! platform.

Note

[1] Such as: Networking/Virtual Communities, scheduled meetings with the school head and/or colleagues, peer review, courses and seminars, collaboration with other schools, diaries, and team teaching (European Commission, 2015[28]).

References

AITSL (2017), *Australian Teacher Workforce Data*, https://www.aitsl.edu.au/research/australian-teacher-workforce-data-strategy (accessed on 6 February 2019). [134]

AITSL (2015), *Accreditation of Initial Teacher Education Programs: Standards and Procedures*, https://www.aitsl.edu.au/docs/default-source/initial-teacher-education-resources/accreditation-of-ite-programs-in-australia.pdf (accessed on 30 December 2017). [94]

Allen, J. (2009), "Valuing practice over theory: How beginning teachers re-orient their practice in the transition from the university to the workplace", *Teaching and Teacher Education*, Vol. 25/5, pp. 647-654, http://dx.doi.org/10.1016/j.tate.2008.11.011. [34]

Aspfors, J. and G. Fransson (2015), "Research on mentor education for mentors of newly qualified teachers: A qualitative meta-synthesis", *Teaching and Teacher Education*, Vol. 48, pp. 75-86, http://dx.doi.org/10.1016/J.TATE.2015.02.004. [29]

Auguste, B., P. Kihn and M. Miller (2010), *Closing the Talent Gap: Attracting and Retaining Top-third Graduates to Careers in Teaching: An International and Market Research-based Perspective*, McKinsey&Company, https://www.mckinsey.com/~/media/mckinsey/industries/social%20sector/our%20insights/closing%20the%20teaching%20talent%20gap/closing-the-teaching-talent-gap.ashx (accessed on 8 February 2019). [140]

Barber, M. and M. Mourshed (2007), *How the World's Best-Performing Schools Systems Come out on Top?*, McKinsey&Company, https://www.mckinsey.com/~/media/mckinsey/industries/social%20sector/our%20insights/how%20the%20worlds%20best%20performing%20school%20systems%20come%20out%20on%20top/how_the_world_s_best-performing_school_systems_come_out_on_top.ashx (accessed on 5 March 2018). [128]

BERA, B. (2014), *Research and the teaching profession: Building the capacity for a self-improving education system. Final Report of the BERA-RSA Inquiry into the Role of Research in Teacher Education*, British Education Research Association, https://www.bera.ac.uk/wp-content/uploads/2013/12/BERA-RSA-Research-Teaching-Profession-FULL-REPORT-for-web.pdf. [58]

Blömeke, S. (2017), "Modelling teachers' professional competence as a multi-dimensional construct", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-7-en. [132]

Boyd, D. et al. (2009), "Teacher Preparation and Student Achievement", *Educational Evaluation and Policy Analysis*, Vol. 31/4, pp. 416-440, http://dx.doi.org/10.3102/0162373709353129. [69]

Brouwer, P. et al. (2016), *Country Background Report, OECD Initial Teacher Preparation Study. The Netherlands*, ecbo. [108]

Brouwer, P. et al. (2016), *OECD TALIS Initial Teacher Preparation Study Country Background Report The Netherlands*, The national Centre of Expertise of Vocational Education, 's-Hertogenbosch. [56]

Burn, K. and T. Mutton (2015), "A review of 'research-informed clinical practice' in Initial Teacher Education", *Oxford Review of Education*, Vol. 41/2, pp. 217-233, http://dx.doi.org/10.1080/03054985.2015.1020104. [4]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [81]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [59]

Canrinus, E. et al. (2017), "Coherent teacher education programmes: Taking a student perspective", *Journal of Curriculum Studies*, Vol. 49/3, pp. 313-333. [98]

Caspersen, J. and F. Raaen (2014), "Novice teachers and how they cope", *Teachers and Teaching*, doi: 10.1080/13540602.2013.848570, pp. 189-211, http://dx.doi.org/10.1080/13540602.2013.848570. [36]

CCSSO (2017), *Transforming Educator Preparation: Lessons Learned from Leading States*, Council of Chief State School Officers, http://www.ccsso.org. (accessed on 5 February 2019). [95]

CentERdata (n.d.), *Education Labor Market Estimates*, https://www.centerdata.nl/en/projects-by-centerdata/education-labor-market-estimates (accessed on 19 December 2018). [133]

Cherubini, L. (2009), "Reconciling the tensions of new teachers' socialisation into school culture: A review of the research", *Issues in Educational Research*, Vol. 19/2, pp. 83-99. [7]

Clinton, J., R. Aston and J. Quach (2018), *Promoting evidence uptake in schools: A review of the key features of research and evidence institutions*, University of Melbourne, http://dx.doi.org/10.4225/49/5aa61c6c75a9e. [74]

Cochran-Smith, M. and A. Villegas (2015), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20. [64]

Cochran-Smith, M. et al. (2015), "Critiquing teacher preparation research: An overview of the field, part II", *Journal of Teacher Education*, Vol. 66/2, pp. 109-121, https://doi.org/10.1177/0022487114558268. [24]

Cochran-Smith, M. and K. Zeichner (2005), *Studying Teacher Education: The report of the AERA Panel on Research and Teacher Education*, American Educational Research Association, published by Lawrence Erlbaum Associates, https://books.google.fr/books?hl=en&lr=&id=hbiLAgAAQBAJ&oi=fnd&pg=PP1&dq=Studying+Teacher+Education:+The+Report+of+the+AERA+Panel+on+Research+and+Teacher+Education.+Lawrence+Erlbaum+Associates.+&ots=kvcbq8M6DT&sig=hrAHfWD_o5TPEUKJAicby2UxLwE (accessed on 1 October 2018). [62]

Cordingley, P. (2015), "The contribution of research to teachers' professional learning and development", *Oxford Review of Education*, Vol. 41/2, pp. 234-252, http://dx.doi.org/10.1080/03054985.2015.1020105. [78]

Cordingley, P. and M. Bell (2012), *Understanding What Enables High Quality Professional Learning*, CUREE and Pearson School Improvement, http://www.curee.co.uk (accessed on 18 February 2018). [79]

Darling-Hammond, L. (2017), "Teacher education around the world: What can we learn from international practice?", *European Journal of Teacher Education*, Vol. 40/3, pp. 291-309, http://dx.doi.org/10.1080/02619768.2017.1315399. [50]

Darling-Hammond, L. and A. Lieberman (2012), *Teacher Education Around the World : Changing Policies and Practices*, Routledge, Abingdon, https://www.routledge.com/Teacher-Education-Around-the-World-Changing-Policies-and-Practices/Darling-Hammond-LIEBERMAN/p/book/9780415577014 (accessed on 4 October 2018). [66]

Davey, R. (2013), *The Professional Identity of Teacher Educators: Career on the Cusp?*, Routledge, London and New York. [127]

Davies, H. (2007), "Academic advice to practitioners—the role and use of research-based evidence", *Public Money and Management*, Vol. 27/4, pp. 232-235. [73]

Deeble, M. and T. Vaughan (2018), "An evidence broker for Australian schools", *Centre for Strategic Education*, Vol. 150. [72]

Dicke, T. et al. (2015), "Reducing reality shock: The effects of classroom management skills training on beginning teachers", *Teaching and Teacher Education*, Vol. 48, pp. 1-12, http://dx.doi.org/10.1016/J.TATE.2015.01.013. [14]

Dolton, P. (2006), "Chapter 19 Teacher Supply", in *Handbook of the Economics of Education*, Elsevier, http://dx.doi.org/10.1016/s1574-0692(06)02019-8. [118]

Dolton, P. and O. Marcenaro-Gutierrez (2011), "If you pay peanuts do you get monkeys? A cross-country analysis of teacher pay and pupil performance", *Economic Policy*, Vol. 26/65, pp. 5-55, http://dx.doi.org/10.1111/j.1468-0327.2010.00257.x. [120]

Donche, V., M. Endedijk and T. Daal (2015), "Differential effects of a long teacher training internship on students' learning-to-teach patterns", *European Journal of Teacher Education*, Vol. 38/4, pp. 484-495, http://dx.doi.org/10.1080/02619768.2015.1057562. [19]

du Plooy, L. et al. (2016), "Searching for research results to inform the design of an initial professional teacher education programme for the foundation phase: A systematic review", *South African Journal of Childhood Education*, Vol. 6/1, pp. 1-8, http://dx.doi.org/10.4102/sajce.v6i1.285. [61]

ETUCE (2008), *Teacher Education in Europe. An ETUCE Policy Paper*, https://www.csee-etuce.org/images/attachments/ETUCE_PolicyPaper_en.pdf. [3]

European Commission (2015), *The Teaching Profession in Europe: Practices, Perceptions, and Policies*, European Commission, https://eacea.ec.europa.eu/national-policies/eurydice/content/teaching-profession-europe-practices-perceptions-and-policies_en (accessed on 26 September 2018). [28]

European Commission (2010), *Developing coherent and system-wide induction programmes for beginning teachers: a handbook for policymakers*. [20]

European Commission/EACEA/Eurydice (2018), *Teaching Careers in Europe Access, Progression and Support*, Publications Office of the European Union, Eurydice Report. Luxembourg, https://eacea.ec.europa.eu/national-policies/eurydice/content/teaching-careers-europe-access-progression-and-support_en. [103]

European Commission/EACEA/Eurydice, E. (2017), *Support Mechanisms for Evidence-based PolicyMaking in Education (Eurydice Report)*, Publications Office of the European Union. [82]

European Union (2013), *The Attractiveness of the Teaching Profession in Europe*, European Union, Luxembourg, http://dx.doi.org/10.2766/40827. [109]

Fenwick, A. and D. Weir (2010), "The impact of disrupted and disjointed early professional development on beginning teachers", *Teacher Development*, Vol. 14/4, pp. 501-517, http://dx.doi.org/10.1080/13664530.2010.533491. [40]

Franke, A. and L. Dahlgren (1996), "Conceptions of mentoring: An empirical study of conceptions of mentoring during the school-based teacher education", *Teaching and Teacher Education*, Vol. 12/6, pp. 627-641, http://dx.doi.org/10.1016/s0742-051x(96)00004-2. [25]

Fransson, G. and C. Gustafsson (2008), *Newly Qualified Teachers in Northern Europe. Comparative Perspectives on Promoting Professional Development*, University of Gävle, Gävle. [23]

Gaede, O. (1978), "Reality Shock: A Problem among First-Year Teachers", *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, Vol. 51/9, pp. 405-409, http://dx.doi.org/10.1080/00098655.1978.9957085. [13]

Gallant, A. and P. Riley (2014), "Early career teacher attrition: new thoughts on an intractable problem", *Teacher Development*, Vol. 18/4, pp. 562-580, http://dx.doi.org/10.1080/13664530.2014.945129. [107]

Gansle, K., G. Noell and J. Burns (2012), "Do Student Achievement Outcomes Differ Across Teacher Preparation Programs? An Analysis of Teacher Education in Louisiana", *Journal of Teacher Education*, Vol. 63/5, pp. 304-317, http://dx.doi.org/10.1177/0022487112439894. [70]

Gershenson, S. et al. (2017), *Discussion PaPer series The Long-Run Impacts of Same-Race Teachers*, http://www.iza.org (accessed on 17 December 2018). [115]

González-Sancho, C. and S. Vincent-Lancrin (2016), "Transforming education by using a new generation of information systems", *Policy Futures in Education*, Vol. 14/6, pp. 741-758, http://dx.doi.org/10.1177/1478210316649287. [76]

Guarino, C., L. Santibañez and G. Daley (2006), "Teacher recruitment and retention: A review of the recent empirical literature", *Review of Educational Research*, Vol. 76/2, pp. 173-208, http://dx.doi.org/10.3102/00346543076002173. [113]

Guerriero, S. (ed.) (2017), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-en. [123]

Guerriero, S. and K. Deligiannidi (2017), "The teaching profession and its knowledge base", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-3-en. [139]

Harris, D. and T. Sass (2008), *Teacher Training, Teacher Quality and Student Achievement*, National Center for Analysis of Longitudinal Data in Education Research, https://caldercenter.org/sites/default/files/1001059_Teacher_Training.pdf (accessed on 19 December 2018). [129]

Hobson, A. (2009), "On being bottom of the pecking order: beginner teachers' perceptions and experiences of support", *Teacher Development*, Vol. 13/4, pp. 299-320, http://dx.doi.org/10.1080/13664530903578256. [42]

Hobson, A. et al. (2009), "Mentoring beginning teachers: What we know and what we don't", *Teaching and Teacher Education*, Vol. 25/1, pp. 207-216, http://dx.doi.org/10.1016/J.TATE.2008.09.001. [21]

Hobson, A. and A. Malderez (2013), "Judgementoring and other threats to realizing the potential of school-based mentoring in teacher education", *International Journal of Mentoring and Coaching in Education*, Vol. 2/2, pp. 89-108, http://dx.doi.org/10.1108/IJMCE-03-2013-0019. [33]

Hobson, A. et al. (2009), *Becoming a Teacher Teachers' Experiences of Initial Teacher Training, Induction and Early Professional Development Final Report*, Department for Children, Schools and Families, http://dera.ioe.ac.uk/11168/1/DCSF-RR115.pdf (accessed on 19 November 2018). [5]

Høigaard, R., R. Giske and K. Sundsli (2012), "Newly qualified teachers' work engagement and teacher efficacy influences on job satisfaction, burnout, and the intention to quit", *European Journal of Teacher Education*, doi: 10.1080/02619768.2011.633993, pp. 347-357, http://dx.doi.org/10.1080/02619768.2011.633993. [37]

Holme, J. et al. (2017), "Rethinking Teacher Turnover: Longitudinal Measures of Instability in Schools", *Educational Researcher*, Vol. 47/1, pp. 62-75, http://dx.doi.org/10.3102/0013189x17735813. [111]

Howsam, R., D. Corrigan and G. Denemark (1985), *Educating a Profession : Report of the Bicentennial Commission on Education for the Profession of Teaching of the American Association of Colleges for Teacher Education - Reprint with postscript.*, American Association of Colleges for Teacher Education, Washington, DC, https://eric.ed.gov/?id=ED270430 (accessed on 4 January 2018). [137]

Hunt, C. (2014), "A Review of School-University Partnerships for Successful New Teacher Induction", *School-University Partnerships*, Vol. 7/1, pp. 35-48. [27]

Ingersoll, R. and M. Strong (2011), "The Impact of Induction and Mentoring Programs for Beginning Teachers: A Critical Review of the Research", *Review of Educational Research*, Vol. 81/2, pp. 201-233, http://dx.doi.org/10.3102/0034654311403323. [26]

Jenset, I., K. Klette and K. Hammerness (2017), "Grounding Teacher Education in Practice Around the World: An Examination of Teacher Education Coursework in Teacher Education Programs in Finland, Norway, and the United Sates", *Journal of Teacher Education*, Vol. 69/2, pp. 184-197, http://dx.doi.org/10.1177/0022487117728248. [2]

Kardos, S. et al. (2001), "Counting on Colleagues: New Teachers Encounter the Professional Cultures of Their Schools", *Educational Administration Quarterly*, Vol. 37/2, pp. 250-290, http://dx.doi.org/10.1177/00131610121969316. [53]

Kelchtermans, G. (2017), "'Should I stay or should I go?': unpacking teacher attrition/retention as an educational issue", *Teachers and Teaching*, Vol. 23/8, pp. 961-977, http://dx.doi.org/10.1080/13540602.2017.1379793. [112]

Kemmis, S. et al. (2014), "Mentoring of new teachers as a contested practice: Supervision, support and collaborative self-development", *Teaching and Teacher Education*, Vol. 43, pp. 154-164, http://dx.doi.org/10.1016/J.TATE.2014.07.001. [31]

Keogh, J. et al. (2012), "Self-determination: Using Agency, Efficacy and Resilience (AER) to Counter Novice Teachers' Experiences of Intensification", *Australian Journal of Teacher Education*, Vol. 37/8, pp. 46-65, http://dx.doi.org/10.14221/ajte.2012v37n8.3. [39]

Koedel, C. et al. (2015), "Teacher Preparation Programs and Teacher Quality: Are There Real Differences Across Programs", *Education Finance and Policy*, Vol. 10/4, pp. 508-534, http://dx.doi.org/10.1162/edfp_a_00172. [71]

Kools, M. and L. Stoll (2017), "What Makes a School a Learning Organisation?", *OECD Education Working Papers*, No. 137, OECD Publishing, Paris, https://dx.doi.org/10.1787/5jlwm62b3bvh-en. [43]

Kraft, M., D. Blazar and D. Hogan (2018), "The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence", *Review of Educational Research*, Vol. 88/4, pp. 547-588, http://dx.doi.org/10.3102/0034654318759268. [49]

Kunter, M. et al. (2013), "Professional competence of teachers: Effects on instructional quality and student development.", *Journal of Educational Psychology*, Vol. 105/3, pp. 805-820, http://dx.doi.org/10.1037/a0032583. [131]

Lane, S., N. Lacefield-Parachini and J. Isken (2003), "Developing Novice Teachers as Change Agents: Student Teacher Placements "Against the Grain"", *Teacher Education Quarterly*, Vol. 30/2, pp. 55-68, http://www.jstor.org/stable/23478469. [46]

Lauermann, F. (2017), "Teacher motivation, responsibility, pedagogical knowledge and professionalism: a new era for research", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-10-en. [130]

Lindsay, J. et al. (2016), *Strategies for Estimating Teacher Supply and Demand Using Student and Teacher Data*, Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest, http://ies.ed.gov/ ncee/edlabs (accessed on 3 December 2018). [122]

Louisiana Board of Regents (n.d.), *Teacher Preparation Data Dashboards & Fact Book*, https://regents.la.gov/divisions/planning-research-and-academic-affairs/academic-affairs/teacher-education-initiatives/teacher-preparation-data-dashboards-fact-book/ (accessed on 5 February 2019). [93]

MA DESE, M. (2016), *Educator Preparation: Program Approval Criteria List*, http://www.doe.mass.edu/edprep/evaltool/2017CriteriaList.pdf. [88]

MA DESE, M. (2016), *Program Approval Guidelines*, http://www.doe.mass.edu/edprep/ProgramApproval.pdf. [87]

Mandinach, E. and E. Gummer (eds.) (2018), *Building Capacity and Commitment for Data Use in Teacher Education Programs*, Routledge. [86]

Mattsson, M., T. Eilertsen and D. Rorrison (eds.) (2011), *A practicum turn in teacher education*, Sense Publishers. [47]

Meierkord, A., V. Donlevy and A. Rajania (2016), *Study on the diversity within the teaching profession with particular focus on migrant and/or minority background - Publications Office of the EU*, European Commission, http://dx.doi.org/10.2766/873440. [116]

Moir, E. (1999), "The stages of a teacher's first year", in Scherer, M. (ed.), *A Better Beginning: Supporting and Mentoring New Teachers*, Association for Supervision and Curriculum Development, Alexandria, VA, https://eric.ed.gov/?id=ED435603 (accessed on 8 February 2019). [38]

NCES (2015), *Teaching Vacancies and Difficult-to-Staff Teaching Positions in Public Schools*, National Center for Education Statistics, https://nces.ed.gov/pubs2015/2015065.pdf (accessed on 24 September 2018). [106]

Newman, E. (2010), "'I'm being measured as an NQT, that isn't who I am': an exploration of the experiences of career changer primary teachers in their first year of teaching", *Teachers and Teaching*, doi: 10.1080/13540601003754830, pp. 461-475, http://dx.doi.org/10.1080/13540601003754830. [12]

Norwegian Ministry of Education and Research (2016), *OECD TALIS initial teacher preparation preparation study. Country Background Report Norway*. [54]

Nusche, D. (2009), "What Works in Migrant Education?: A Review of Evidence and Policy Options", *OECD Education Working Papers*, No. 22, OECD Publishing, Paris, https://dx.doi.org/10.1787/227131784531. [114]

Nusche, D. et al. (2014), *OECD Reviews of Evaluation and Assessment in Education: Netherlands 2014*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264211940-en. [97]

OECD (2018), *Education at a Glance 2018: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2018-en. [119]

OECD (2018), *Effective Teacher Policies: Insights from PISA*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264301603-en. [102]

OECD (2018), *Innovation Strategy for Education and Training*, http://www.oecd.org/education/ceri/innovationstrategyforeducationandtraining.htm (accessed on 5 December 2018). [75]

OECD (2018), *School Resources Review (forthcoming report on human resources)*, OECD Publishing, http://www.oecd.org/education/school-resources-review/ (accessed on 19 December 2018). [100]

OECD (2016), *PISA 2015 Results (Volume I): Excellence and Equity in Education*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264266490-en. [104]

OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264267510-en. [101]

OECD (2016), *What makes a school a learning organisation?*, OECD Publishing, Paris, http://www.oecd.org/education/school/school-learning-organisation.pdf (accessed on 30 November 2018). [57]

OECD (2014), *TALIS 2013 Results: An International Perspective on Teaching and Learning*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264196261-en. [8]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [85]

OECD (2013), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20. [10]

OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, OECD Reviews of Tertiary Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264046535-en. [84]

OECD (2007), *Evidence in Education: Linking Research and Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264033672-en. [60]

OECD (2005), *Teachers Matter - Attracting, Developing and Retaining Effective Teachers*, OECD Publishing, Paris, http://new.sourceoecd.org/education/9264018026 (accessed on 14 March 2018). [117]

OECD (2005), *Teachers Matter. Attracting, developing and retaining effective teachers*. [55]

OECD (2005), *Teachers Matter: Attracting, Developing and Retaining Effective Teachers*, Education and Training Policy, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264018044-en. [110]

Paniagua, A. and D. Istance (2018), *Teachers as Designers of Learning Environments: The Importance of Innovative Pedagogies*, Educational Research and Innovation, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264085374-en. [44]

Paniagua, A. and A. Sánchez-Martí (2018), "Early Career Teachers: Pioneers Triggering Innovation or Compliant Professionals?", *OECD Education Working Papers*, No. 190, OECD Publishing, Paris, https://dx.doi.org/10.1787/4a7043f9-en. [35]

Peck, C., C. Gallucci and T. Sloan (2010), "Negotiating implementation of high-stakes performance assessment policies in teacher education: from compliance to inquiry", *Journal of Teacher Education*, Vol. 61/5, pp. 451-463, http://dx.doi.org/10.1177/0022487109354520. [63]

Pedaste, M. et al. (2014), "A Model of Innovation Schools: Estonian Case-study", *Procedia - Social and Behavioral Sciences*, Vol. 112, pp. 418-427, http://dx.doi.org/10.1016/J.SBSPRO.2014.01.1184. [45]

Pettersson, D. and C. Molstad (2016), "PISA Teachers: The hope and the happening of educational development", *Educação & Sociedade*, Vol. 37/136, pp. 629-645, http://dx.doi.org/10.1590/es0101-73302016165509. [51]

Picard, P. and L. Ria (2011), *Beginning teachers: a challenge for educational systems*, CIDREE, Lyon. [22]

Podolsky, A. et al. (2016), *Solving the Teacher Shortage How to Attract and Retain Excellent Educators*, Learning Policy Institute, Palo Alto, CA, https://learningpolicyinstitute.org/sites/default/files/product-files/Solving_Teacher_Shortage_Attract_Retain_Educators_REPORT.pdf (accessed on 6 December 2018). [135]

Révai, N. (2018), "What difference do standards make to educating teachers?: A review with case studies on Australia, Estonia and Singapore", *OECD Education Working Papers*, No. 174, OECD Publishing, Paris, https://dx.doi.org/10.1787/f1cb24d5-en. [138]

Révai, N. and S. Guerriero (2017), "Knowledge dynamics in the teaching profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-4-en. [11]

Rhode Island Department of Education (n.d.), *Rhode Island Educator Preparation Index*, http://www3.ride.ri.gov/RIEdPrepIndex/ (accessed on 5 February 2019). [92]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [99]

Rockoff, J. (2008), *Does mentoring reduce turnover and improve skills of new employees? Evidence from teachers in New York City*, National Bureau of Economic Research, Cambridge, MA, http://www.nber.org/papers/w13868. [48]

Rots, I., G. Kelchtermans and A. Aelterman (2012), "Learning (not) to become a teacher: A qualitative analysis of the job entrance issue", *Teaching and Teacher Education*, Vol. 28, pp. 1-10, http://dx.doi.org/10.1016/j.tate.2011.08.008. [17]

Sahlberg, P. (2010), *The Secret to Finland's Success: Educating Teachers | Stanford Center for Opportunity Policy in Education*, Stanford Center for Opportunity Policy in Education Research Brief, https://edpolicy.stanford.edu/library/publications/290 (accessed on 12 November 2018). [121]

Schatz-Oppenheimer, O. and N. Dvir (2014), "From ugly duckling to swan: Stories of novice teachers", *Teaching and Teacher Education*, Vol. 37, pp. 140-149, http://dx.doi.org/10.1016/J.TATE.2013.10.011. [15]

Schleicher, A. (2018), *Valuing our Teachers and Raising their Status: How Communities Can Help*, International Summit on the Teaching Profession, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264292697-en. [136]

Schleicher, A. (2018), *World Class: How to Build a 21st-Century School System*, Strong Performers and Successful Reformers in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264300002-en. [124]

Schleicher, A. (2011), *Building a High-Quality Teaching Profession: Lessons from around the World*, International Summit on the Teaching Profession, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264113046-en. [52]

Schuck, S. et al. (2018), "The experiences of early career teachers: new initiatives and old problems", *Professional Development in Education*, Vol. 44/2, pp. 209-221, http://dx.doi.org/10.1080/19415257.2016.1274268. [6]

Simmie, G. et al. (2017), "Discursive positioning of beginning teachers' professional learning during induction: a critical literature review from 2004 to 2014", *Asia-Pacific Journal of Teacher Education*, doi: 10.1080/1359866X.2017.1280598, pp. 505-519, http://dx.doi.org/10.1080/1359866X.2017.1280598. [32]

Sonmark, K. et al. (2017), "Understanding teachers' pedagogical knowledge: report on an international pilot study", *OECD Education Working Papers*, No. 159, OECD Publishing, Paris, https://dx.doi.org/10.1787/43332ebd-en. [89]

Spooner-Lane, R. (2017), "Mentoring beginning teachers in primary schools: research review", *Professional Development in Education*, doi: 10.1080/19415257.2016.1148624, pp. 253-273, http://dx.doi.org/10.1080/19415257.2016.1148624. [41]

Sutcher, L., L. Darling-Hammond and D. Carver-Thomas (2016), *A Coming Crisis in Teaching? Teacher Supply, Demand, and Shortages in the U.S.*, Learning Policy Institute, https://learningpolicyinstitute.org/product/coming-crisis-teaching-brief. [105]

Tatto, M. (2015), "The role of research in the policy and practice of quality teacher education: an international review", *Oxford Review of Education*, Vol. 41/2, pp. 171-201, http://dx.doi.org/10.1080/03054985.2015.1017405. [77]

Tatto, M. et al. (2016), "The emergence of high-stakes accountability policies in teacher preparation: an examination of the U.S. Department of Education's proposed regulations", *Education Policy Analysis Archives*, Vol. 24/0, p. 21, http://dx.doi.org/10.14507/epaa.24.2322. [68]

TEMAG (2014), *Action Now: Classroom Ready Teachers*, Teacher Education Ministerial Advisory Group, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_print.pdf. [91]

TEMAG, T. (2014), *Action Now: Classroom Ready Teachers (Teacher Education Ministerial Advisory Group Final Report)*, Australian Department of Education, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf. [83]

Timperley, H. et al. (2007), *Teacher Professional Learning and Development Best Evidence Synthesis Iteration [BES]*, New Zealand: Ministry of Education, Wellington, http://educationcounts.edcentre.govt.nz/goto/BES (accessed on 11 October 2018). [80]

Toon, D., B. Jensen and S. Cooper (2017), *Teaching Our Teachers: a Better Way - Continuous Improvement in Teacher Preparation*, Learning First, Melbourne, http://www.learningfirst.com. (accessed on 4 October 2018). [67]

Toril, F., A. Lund and B. Simonsen (2016), *Country Background Report Norway; OECD TALIS initial teacher preparation preparation study.*. [141]

Valencic Zuljan, M. and B. Marentic Požarnik (2014), "Induction and Early-caree Support of Teachers in Europe", *European Journal of Education*, Vol. 49/2, pp. 192-205, http://dx.doi.org/10.1111/ejed.12080. [1]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [96]

Walsh, K. and S. Jacobs (2007), *Alternative Certification Isn't Alternative*, Thomas B. Fordham Institute and National Council on Teacher Quality, Washington, http://www.edexcellence.net/institute, (accessed on 5 December 2018). [126]

Wang, J. and S. Odell (2007), "An alternative conception of mentor–novice relationships: Learning to teach in reform-minded ways as a context", *Teaching and Teacher Education*, Vol. 23/4, pp. 473-489, http://dx.doi.org/10.1016/J.TATE.2006.12.010. [30]

Welsh government (2017), *Connecting Research and Teacher Education: Quality Enhancement for ITE Partnerships*, Education Directorate, Welsh Government,, http://learning.gov.wales/resources/browse-all/connecting-research-and-teacher-education/?lang=en. [90]

White, J. and J. Moss (2003), *Professional Paradoxes: Context for Development of Beginning Teacher Identity and Knowledges*, Australian Association for Research in Education, Coldstream. [16]

Wilson, S., R. Floden and J. Ferrini-Mundy (2001), *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, Center for the Study of Teaching and Policy, Washington DC, https://www.education.uw.edu/ctp/content/teacher-preparation-research-current-knowledge-gaps-and-recommendations (accessed on 4 October 2018). [65]

Woods, P. (1977), "Teaching for survival", in Woods, P. and M. Hammersley (eds.), *School Experience*, Croom Helm, London. [18]

Wyss, C., M. Kocher and M. Baer (2017), "The dilemma of dealing with persistent teaching traditions: findings of a video study", *Journal of Education for Teaching*, Vol. 43/2, pp. 191-205, http://dx.doi.org/10.1080/02607476.2017.1286782. [9]

Zeichner, K. (2014), "The struggle for the soul of teaching and teacher education in the USA", *Journal of Education for Teaching*, pp. 1-18, http://dx.doi.org/10.1080/02607476.2014.956544. [125]

Chapter 6. Towards principles of governing initial teacher preparation systems?

This last chapter discusses four principles that emerge from the challenges and strategies presented in this report with regards to governing initial teacher preparation systems. In particular, it first highlights the importance of strategic thinking and sets out a vision for initial teacher preparation (ITP) in the context of teacher learning as a continuum. Second, it discusses key elements of effective knowledge governance and how these can be implemented with respect to ITP. Third, the chapter emphasises the role of building capacity at the individual, organisational and system levels. Finally, it concludes by emphasising a whole-of-system perspective through strong partnerships and networks to drive systemic improvement.

This report has described the key challenges and corresponding strategies as they relate to designing initial teacher preparation as the foundational stage in the continuum of teacher learning. It presented teacher education as a complex system of multi-layered contexts, schools and policy environments – "a cluster of simultaneous interactions at multiple levels which people become part of for a period of time" (Ell et al., 2017[1]). Clearly, creating a coherent learning experience for teacher candidates, new and experienced teachers in such complexity requires system level coordination. This section summarises the strategies laid out above (see Table 6.1) with a view to governing initial teacher preparation (ITP) systems in ways that foster the development of coherent, evidence-informed, sustainable and self-improving systems.

Table 6.1. Strategies for improving ITP systems

Challenge	Strategies
Ensuring an evidence-informed, self-improving ITP system	1. Supporting rigorous and relevant research on ITP 2. Introducing accreditation that incentivises ITP institutions to build their own evidence and implement a continuous improvement approach 3. Fostering the dissemination and utilisation of evidence throughout the system
Ensuring a balanced teacher workforce	4. Using diversified longitudinal ITP data in actively forecasting workforce needs 5. Raising the status of teaching and teacher education 6. Attracting, selecting and hiring "the right" candidates
Equipping teachers with updated knowledge	7. Continuously reflecting on what knowledge and competences are relevant for teaching 8. Fostering deep school-teacher education institution partnerships and feedback loops 9. Supporting teacher educators to continually improve their knowledge and practice
Providing integrated early professional development	10. Offering extensive opportunities for teacher learning grounded in practice 11. Building on the experience of effective induction and mentoring programmes 12. Embedding new teachers' early development in a culture of continuous professional learning

These strategies and the suggested forms of implementation are interconnected in multiple ways. For example, at least eight strategies are directly related to the effective production, use and dissemination of knowledge (1, 2, 3, 4, 6, 7, 8, and 11), while other six strategies (3, 5, 6, 8, 10, and 12) point to the need to understand and design ITP as a system. The ways in which the different stakeholders can apply these suggested strategies suggest that the following are vital elements in ITP systems:

1. The continuity and coherence of teacher learning throughout the career is at the heart of a strategic vision for ITP systems.
2. A sustainable ITP system requires the systematic production, mediation and use of data and evidence.
3. A self-improving ITP system needs strong capacity at all levels.
4. A whole-of-system view through cross-institutional and multilevel partnerships, engaging all actors and establishing positive feedback loops is necessary to ensure a coherent ITP system.

These four emerging principles are discussed in more details in the next sections.

6.1. Strategic thinking in governing ITP systems for coherent and continuous teacher learning

Flying start – the title of this report – reflects the key principle of the ITP study, which is conceptualising teacher learning as a continuum, in which initial teacher preparation is the beginning of a process of professional development and relationship with the wider education community. Developing this continuum across institutional boundaries, support systems, career structures and local school contexts, that is, in a complex ITP system, requires strategic thinking. A strategy first needs a vision for ITP shared among multiple agents. The mission for all institutions and actors, and the specific action plans to establish and sustain ITP based on the shared vision needs the capacity of all to work within a system perspective and understand planning as a dialogue.

When developing a vision, we need to take into account that initial teacher preparation does not work in a vacuum, but is driven by outstanding goals in education. Typically, the following common goals underpin educational policy agendas that aim at preparing future generations to participate in framing solutions for the challenges of our era:

- Improve the learning outcomes and the quality of education provision in line with new contexts and challenges
- Ensure equity
- Improve the efficiency of the system.

Addressing these goals expands beyond the mission of ITP systems to ensure a balanced teacher workforce and highlights the need for improving the quality of teacher learning. In this sense, ITP has to build also on the role of the teaching profession, on how to train effective teachers, according to a set of well-established standards of practice and pedagogical knowledge that would be capable of advancing innovations and working collaboratively with other colleagues. Further, it has implications for understanding schools and teacher education institutions as learning organisations that are able to address problems and develop new solutions attuned to the communities they serve.

The vision for ITP as the first stage in a continuum is based on three main principles of understanding the teacher profession:

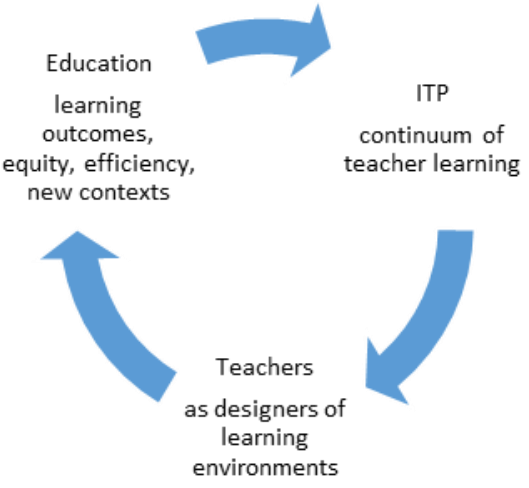
- *Teachers as learners.* In the same way as their students, teachers need to be provided with a system of scaffolding that must help them develop and allow them to fulfil their potential as professionals. Continuously questioning their practice, developing their own educational ideals and strengthening their conceptions of equity and social justice are fundamental elements of teachers as learners.
- *Relevance of learning that takes place after ITP.* The idea that teachers work alone and should take full responsibility over their classes from day one undermines the relevance of career-long professional development. A strategic vision for ITP should start with the assumption that becoming a teacher does not finish during the induction phase and therefore initial preparation. While ensuring minimum standards for teacher graduates, ITP must lay the foundation for an ongoing learning process. This implies that ITP systems should not be expected to cover all the possible competences for teachers, or to anticipate all the potential situations that new teachers may encounter, but to equip teachers for lifelong and collaborative learning.

- *Clinical and research practice in particular contexts.* Embedding continually evolving knowledge coming from research and experience is key for teachers' continuous growth. The interaction of knowledge about practice and enacting knowledge in practice includes translating learning theories into practice, experimenting with their implementation in particular contexts, as well as strengthening the validity of new practices. As a result, ITP must move beyond the theory-practice divide and prepare teachers for an ongoing enquiry about their practice. This necessitates creating strong partnerships with schools for allowing rapid flows of newly emerging knowledge and evidence.

An explicit common vision helps the system avoid conflicting agendas such as having rigid standards while understanding teaching as a creative, innovative profession. It also encourages a constructive dialogue through, for example, developing specific missions and actions plans to achieve shared goals according to the different realities of schools. Figure 6.1 illustrates the way forging a shared vision for ITP based on a continuum of teacher learning is anchored in the definition of educational goals and the role of the teacher profession.

Figure 6.1. The idea of continuum as a rational goal and an appealing strategic view

ITP continuum defines the role of teachers according to wider educational goals



This report argues that the idea of a continuum does not only provide stakeholders with a meaningful concept that helps steer the system, it also sets out an appealing view for bringing them together in realising this goal. The above-described vision for ITP helps systems to creatively think about how to ensure a sustainable teaching workforce while improving its quality. It can serve as the basis for designing coherent policies and establishing well-adapted environments for policy implementation.

6.2. Governing knowledge for evidence-informed ITP systems

The strategic governance of an education system requires an effective organisation and flow of knowledge (Burns, Köster and Fuster, 2016[2]). Identifying what knowledge is relevant in a given context is a prerequisite for effective knowledge management (Fazekas and Burns, 2012[3]). Developing a strategic approach to mobilising relevant knowledge involves thinking about its production and utilisation, as well as the link

between these, i.e. knowledge mediation (Burns, Köster and Fuster, 2016[2]). Knowledge governance in this sense, involves the following elements:

- collecting quality and rich data for research and decision-making
- facilitating access to data and knowledge
- promoting a culture of using rich data and knowledge (OECD, 2018[4]).

With regards to governing ITP systems, two types of knowledge can be distinguished: knowledge that is relevant for designing ITP policies and knowledge that is relevant for the practice of ITP actors. Knowledge can originate from data sources (e.g. quantitative and qualitative data on teacher candidates, teachers, teacher educators), and evidence.

The challenges described in this report discussed some of the evidence collected in the ITP study, and available in international literature. Descriptions also pointed to gaps that still need to be filled. Table 6.2 lists the most important areas of evidence. While available data and evidence is dependent on particular systems, for many of these topics the amount of evidence does not yet seem globally robust. Available evidence is still often patchy, not well connected, not easily accessible and sometimes controversial. In some areas, however, such as student learning, instructional processes and teacher motivation, research activity is high in many countries.

Table 6.2. Evidence in ITP – a to do exercise for governing knowledge

Based on the ITP study and elements of the international literature

ITP stage	Evidence and data	Knowledge for policy (relevant to design and sustain ITP systems)	Knowledge for practice (relevant for ITP actors in their practice)
Attracting and retaining	Evidence on teachers' motivational characteristics	x	x
	Data on attrition and evidence on its cause	x	x
	Teacher diversity	x	
Selecting	Evidence on the impact of teacher candidates' background characteristics (e.g. previous academic achievement) on their later teaching competences	x	x
Equipping & quality	Evidence on student learning (e.g. neurosciences, 21st century competences)		x
	Evidence on instructional processes (e.g. effectiveness of teaching methods, evaluation)		x
	Impact of innovative teaching approaches		x
	Evidence about university-based teacher educators' status and identity	x	
	Evidence about university-based teacher educators' quality (e.g. pedagogical practices, professional knowledge and competences)	x	x
Supporting	Evidence on the impact of induction initiatives (e.g. in-depth qualitative studies)	x	x
	Evidence on mentors' status and identity.	x	x
	Evidence on mentors' quality (e.g. pedagogical practices, professional knowledge and competences)	x	x
Certifying and hiring	Longitudinal ITP data that facilitate forecasting workforce needs (e.g. student and teacher candidate enrolment, certified teachers, teacher migration, shortages)	x	
	Integrated data on teacher candidates, new teachers, teacher educators and mentors in ITE institutions	x	x
ITP implementations and effectiveness	Impact of structural features of ITP programmes	x	
	Systematic reviews/evaluations of ITP programmes and practices	x	
	Evidence on effective ITP practices across institutions of the system	x	
	Relationships between ITP components and teacher candidates' learning	x	

Compiling similar lists and determining the status of evidence and data for each topic is a useful exercise that ITP actors and policy makers could perform when governing knowledge. In areas where more evidence is needed, ITP leaders can map actors who have the capacity to contribute to building the evidence by collecting data, conducting research, coordinating and systematising existing evidence, and mediating this towards practice. For example, teacher candidates, teachers and researchers involved in initial teacher education (ITE) can co-conduct research on instructional processes. ITE institutions can work together to coordinate such research projects and then synthesise the outcomes to strengthen the evidence base at the system level. This in turn needs to be built in ITE programmes, which requires mediation by ITE leaders and teacher educators. Mentors and school leaders can also play a role in mediating evidence towards schools and teaching practice. It has been argued that practitioners will find research relevant and

more directly applicable for their practice if they have a certain degree of ownership over the research (Révai and Guerriero, 2017[5]).

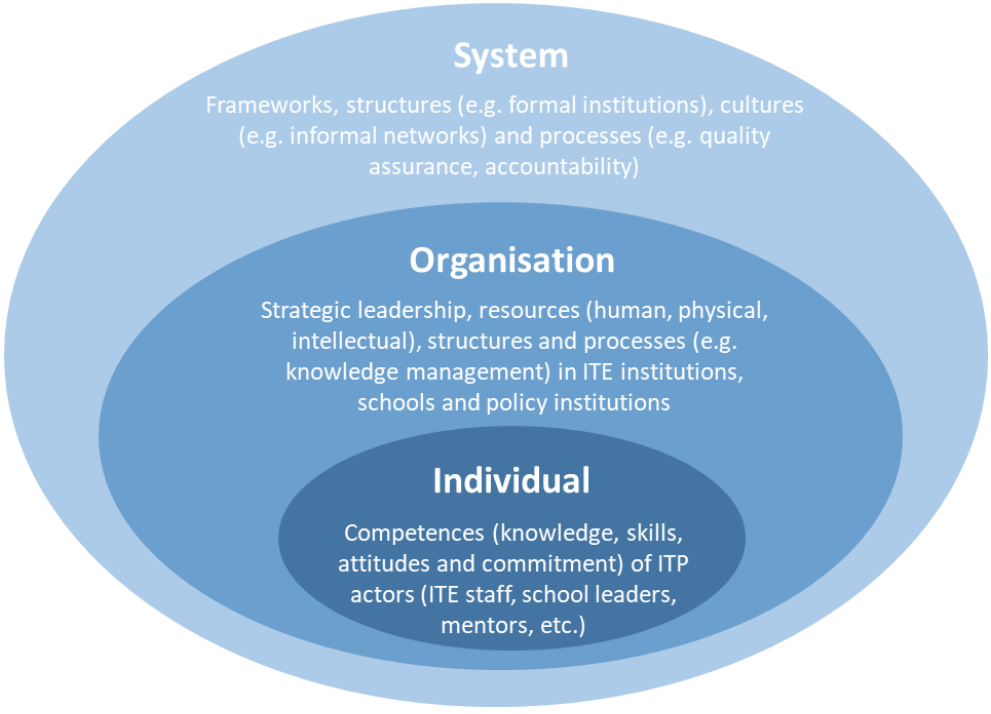
In areas that are relevant for policy design, such as the effectiveness of certain ITP practices (for example induction programmes), relevant actors may include policy institutions, brokerage agencies (e.g. to conduct systematic reviews and meta-analyses), but also teacher education institutions and schools to collaborate in data collection.

Similarly to facilitating strong partnerships, a strategic governance of knowledge in ITP systems requires established mechanisms, funding schemes, incentives and so on. These efforts will then also lead to a more systematic and integrated knowledge base for ITP systems. The OECD CERI is currently engaged in developing a policy toolkit to support countries and stakeholders in governing complex systems, including in governing knowledge (OECD, 2018[4]).

6.3. Building capacity for self-improving ITP systems

Developing the individual professional competences of all actors playing a role in ITP design and development (e.g. teacher educators, mentors, heads of ITE institutions, school leaders, and policy makers responsible for ITP) is at the heart of quality and evidence-based teacher education programmes. Capacity building should however go beyond that, and include developing organisational and system level capacity as well (Figure 6.2).

Figure 6.2. Framework for capacity building in ITP



Source: Based on Matachi (2006[6]), Capacity Building Framework, UNESCO.

At the individual level, capacity building involves developing teacher educators' knowledge and competences to process, evaluate and integrate new evidence on teaching

and learning into their teaching practice. Teacher educators also need to be able to facilitate the production of evidence, as well as explore and model up-to-date pedagogies. As discussed in Chapter 5, those who are supporting beginning teachers during their induction and in their early years whether they are school-based mentors, experienced teacher colleagues or external coaches, need specific knowledge and competences. These have to be acknowledged and strategically developed. In turn, school leaders responsible for leading their pedagogical team, need for example knowledge of human resource development and management (e.g. selecting, supporting, monitoring mentors, beginning and experienced teachers), and a capacity to build personal and professional relationships, as well as a team (Révai and Kirkham, 2013[7]).

An organisational capacity – resources, structures, processes and leadership – is needed to provide individuals with opportunities to develop in and fulfil their multiple roles. This also includes having a shared vision of the continuity of teacher learning, a culture of valuing people's ideas, encouraging collaborative learning and building collective knowledge to move towards that vision. For this, organisations also need to develop distributed leadership for learning. Using a concept from modern management literature, organisations involved in ITP (ITE and policy institutions and schools) need to become learning organisations in order to address the challenges described in this report (Kools and Stoll, 2016[8]). In fact, the suggested strategies laid out in the chapters are very much in line with the recommendations formulated specifically for systems aiming to turn schools into learning organisations:

- establishing stronger collaborations between schools and teacher education institutions
- promoting professional learning throughout the professional lifecycle through enquiry, exploration and innovation; strong induction programmes; mentoring and coaching, observations and peer review
- developing learning leadership in schools and other parts of the system (OECD, 2018[9]).

At the system level, capacity is required to create appropriate structures, and perhaps more importantly, facilitate processes that allow the continuous improvement of teacher preparation. For this, system level ITP leaders need to be aware of the challenges discussed in the previous sections and need to have knowledge and competences to address them. A key element is the capacity to govern data, knowledge and evidence across the system as described in the previous section. To date, only few systems provide regular training for stakeholders in using data for their purposes (González-Sancho and Vincent-Lancrin, 2016[10]).

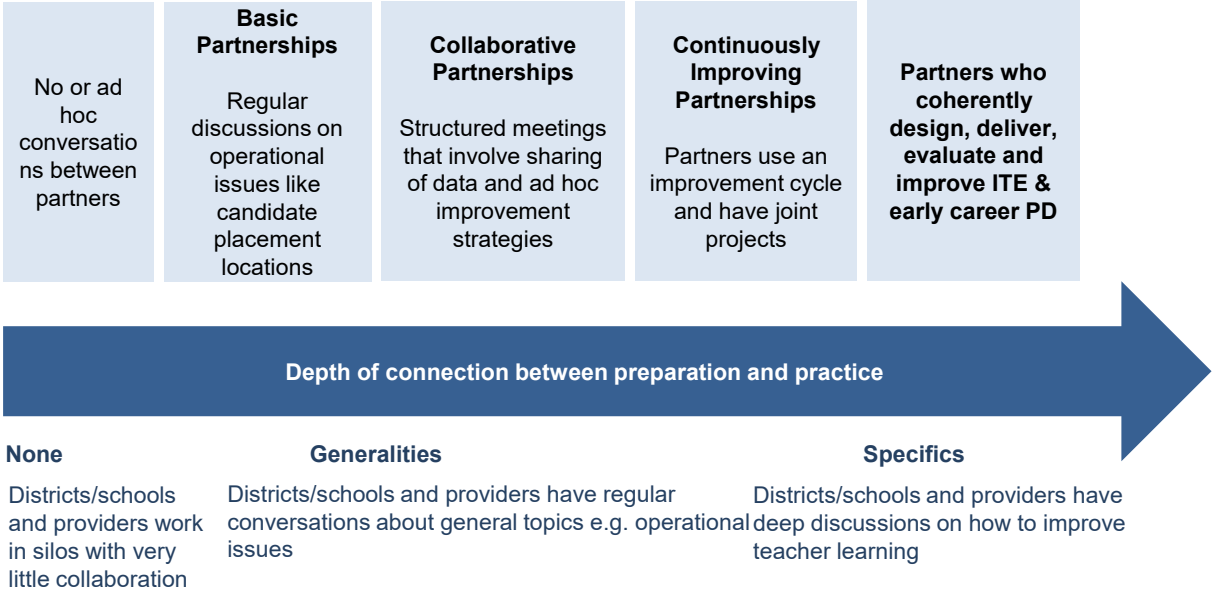
6.4. A whole-of-system perspective for a coherent ITP system

If ITP is considered as a continuum, it should provide beginning teachers with a coherent learning experience across coursework, practical training, induction and early career professional development. Yet, ITP is often a fragmented experience for many beginning teachers, and stakeholders in ITP systems struggle to work together to create a coherent learning experience (Beck and Kosnik, 2009[11]; Hammerness and Klette, 2015[12]; Grossman, Hammerness and McDonald, 2009[13]). Key stakeholders in teacher education – teacher educators, mentor teachers, policy makers and teacher candidates – do not cohere on the basic elements of teacher education nor its strongest influences (Ell et al., 2017[1]). Most teacher candidates, teacher educators and researchers belong to the tertiary

education system, whereas most teacher mentors, school leaders and policy makers operate in the school system. The fact that different policy makers are often responsible for the different elements of the teacher education pathway also makes it a challenge for stakeholders to co-create a coherent learning experience for beginning teachers. Schools often have little say over the design of ITP programmes, and ITP institutions often have little say over the design of school induction programmes and other support schemes provided to beginning teachers, as was the case in almost all the countries reviewed as part of the OECD ITP study.

A coherent ITP system needs to establish cross-institutional and multilevel partnerships to engage stakeholders who belong to different contexts in a whole-of-system perspective. Strong partnerships are more than regular discussions between schools and ITP institutions on operational issues such as practical training placements, and include designing, evaluating and improving programmes together (Toon and Jensen, 2017[14]) as depicted in Figure 6.3.

Figure 6.3. Levels of depth in partnership collaboration



Source: Toon, D. and B. Jensen (2017[14]), *Teaching our Teachers: a Better Way - Developing Partnerships to Improve Teacher Preparation*, Learning First, Melbourne, http://learningfirst.com/wp-content/uploads/2018/03/2columnsITECoPPaper2PartnershipsFINAL17Nov17.pdf (accessed on 11 October 2018).

As described throughout this report, strong partners collaborate to provide authentic and reflective practical training and induction experiences for beginning teachers. They discuss decisions about selection into ITP programmes and hiring into schools based on the needs of the local context. They routinely share and discuss quantitative data on candidate outcomes as well as qualitative information from graduate teachers and schools to inform programme improvement.

To ensure that school-university partnerships live up to their potential, ITP stakeholders need a common vision and commitment to work towards that. This is however not enough. Systems require deliberate strategies to build strong partnerships:

- *Mechanisms to support the collaboration of different partners and institutions*. Co-ordinated knowledge sharing, and formal feedback and mutual review processes, in which partners share and analyse data and feedback to identify both strengths and areas for improvement, are examples of mechanisms that support partnerships. Accountability mechanisms such as programme accreditation and school review processes can also encourage strong partnerships if this is an explicit element in them. Accreditation reviews can recognise those partners who successfully collaborate on programme improvement initiatives. Similarly, an explicit collaboration with ITE institutions on preparing and supporting beginning teachers could be included in school review/evaluation processes.
- *Collaborative learning*. Collaborative practices and a collaborative culture should be embedded into ITP systems. Schools and ITE institutions should participate in networks, professional learning communities and other learning partnerships with shared responsibility for learning, mutual support of each other's learning, supportive leadership and a commitment to the common good (European Commission, 2015[15]). Systems can support collaborative learning by offering learning opportunities to all stakeholders involved in ITP – those based in schools, universities and other institutions. For example, providing tools and joint training in topics that are a priority to the system (e.g. new school curriculum, assessment and evaluation) can strengthen connections, and help build a shared understanding and language.
- *Sustainable resources: dedicated time and ongoing funding*. Collaboration needs investment, and all actors across the system need dedicated and recognised time for engaging in partnerships. Short term funding mechanisms can impede the establishment of ongoing and well-functioning partnerships and networks of ITP stakeholders. Providing additional funding to accredited school-university partnerships is a way to ensure standards for deep collaboration.
- *Fostering professional responsibility, agency and trust*. Guaranteeing stakeholders' agency over processes of decision making, steering and monitoring is key to establishing strong partnerships (European Commission, 2015[15]). As partnerships depend on the stakeholders' involvement in building a shared purpose, mutual trust and respect, and common language over a number of years, they cannot simply be mandated by the system (Toon and Jensen, 2017[14]). Rather, the system should encourage professional responsibility and personal ownership. Likewise, evaluation and feedback loops can easily make actors vulnerable, as they share genuine areas for improvement and must be willing to implement change based on the feedback. Such mechanisms therefore require a high level of trust and transparency.

However, sometimes partnerships, not only actors, also work in isolation, which may provoke opposing effects at the system level. Therefore, coordinating different governance levels and policies, and aligning the diverse roles and responsibilities of actors is necessary (OECD, 2018[4]).

Establishing or incentivising the creation of networks can allow different stakeholders to mutually apply pressure on each other towards an explicit goal, creating communities of

practices around the reflection on common challenges (Burns, Köster and Fuster, 2016[2]). Such networks have the potential of connecting professional learning at different levels: from school and ITE institution to cluster to system level, thus enhancing system capacity (OECD, 2015[16]). Networks for knowledge sharing, skill development, and reflection on practice among schools have proved to be successful for culture change, capacity creation, collaboration and the scaling of innovations (OECD, 2013[17]).

A recent report by the European Commission identifies three potential benefits of different networks:

- networks as policy or practice incubators (experimenting with new practices to address certain challenges and testing them)
- networks as a tool for educational governance (ensuring quality assurance processes and resource management)
- networks as a participatory democratic form (peer learning, knowledge sharing or addressing specific issues in national policy) (European Commission, 2017[18]).

Similarly to partnerships, networks are effective when they maintain a clear focus on purpose and mobilise quality information (Burns, Köster and Fuster, 2016[2]). Other essential criteria are developing high-trust relationships, ensuring appropriate frequency of interactions inwards and outwards, and a deliberate strategy to focus on leadership from the middle in relation to system goals and local needs (Hargreaves and Ainscow, 2015[19]). Overall, networks are forms of distributed leadership, and offer windows of opportunity for participants to move beyond their own interests and navigate through different institutional boundaries and rationales.

To sum up, a whole-of-system perspective is necessary to moderate tensions and drive systemic improvement. Governing ITP with a view to the whole system is a time-consuming enterprise, and it must be grounded in an ownership of the policy objectives and planned action among the stakeholders implementing the policy (Burns, Köster and Fuster, 2016[2]). Engaging stakeholders in processes at all levels is therefore a prerequisite for implementing a whole-of-system approach. Given the highly diverse needs of the actors that configure ITP systems, the implementation of the continuum on teacher learning discussed in this report calls for ITP policies to be flexible enough to respond to unexpected situations and continuously integrate new knowledge and embrace emerging patterns.

References

AITSL (2015), *Accreditation of Initial Teacher Education Programs: Standards and Procedures*, https://www.aitsl.edu.au/docs/default-source/initial-teacher-education-resources/accreditation-of-ite-programs-in-australia.pdf (accessed on 30 December 2017). [55]

Beck, C. and C. Kosnik (2009), *Priorities in Teacher Education: The 7 Key Elements of Pre-service Preparation*, Routledge, London, https://www.taylorfrancis.com/books/9781135226190 (accessed on 1 October 2018). [11]

BERA, B. (2014), *Research and the teaching profession: Building the capacity for a self-improving education system. Final Report of the BERA-RSA Inquiry into the Role of Research in Teacher Education*, British Education Research Association, https://www.bera.ac.uk/wp-content/uploads/2013/12/BERA-RSA-Research-Teaching-Profession-FULL-REPORT-for-web.pdf. [20]

Boyd, D. et al. (2009), "Teacher Preparation and Student Achievement", *Educational Evaluation and Policy Analysis*, Vol. 31/4, pp. 416-440, http://dx.doi.org/10.3102/0162373709353129. [31]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [42]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262829-en. [2]

Canrinus, E. et al. (2017), "Coherent teacher education programmes: Taking a student perspective", *Journal of Curriculum Studies*, Vol. 49/3, pp. 313-333. [59]

CCSSO (2017), *Transforming Educator Preparation: Lessons Learned from Leading States*, Council of Chief State School Officers, http://www.ccsso.org. (accessed on 5 February 2019). [56]

Clinton, J., R. Aston and J. Quach (2018), *Promoting evidence uptake in schools: A review of the key features of research and evidence institutions*, University of Melbourne, http://dx.doi.org/10.4225/49/5aa61c6c75a9e. [36]

Cochran-Smith, M. and A. Villegas (2015), "Framing teacher preparation research: An overview of the field, part I", *Journal of Teacher Education*, Vol. 66/1, pp. 7-20. [26]

Cochran-Smith, M. et al. (2015), "Critiquing teacher preparation research: An overview of the field, part II", *Journal of Teacher Education*, Vol. 66/2, pp. 109-121, https://doi.org/10.1177/0022487114558268. [24]

Cochran-Smith, M. and K. Zeichner (2005), *Studying Teacher Education: The report of the AERA Panel on Research and Teacher Education*, American Educational Research Association, published by Lawrence Erlbaum Associates, https://books.google.fr/books?hl=en&lr=&id=hbiLAgAAQBAJ&oi=fnd&pg=PP1&dq=Studying+Teacher+Education:+The+Report+of+the+AERA+Panel+on+Research+and+Teacher+Education.+Lawrence+Erlbaum+Associates.+&ots=kvcbq8M6DT&sig=hrAHfWD_o5TPEUKJAicby2UxLwE (accessed on 1 October 2018). [23]

Cordingley, P. (2015), "The contribution of research to teachers' professional learning and development", *Oxford Review of Education*, Vol. 41/2, pp. 234-252, http://dx.doi.org/10.1080/03054985.2015.1020105. [39]

Cordingley, P. and M. Bell (2012), *Understanding What Enables High Quality Professional Learning*, CUREE and Pearson School Improvement, http://www.curee.co.uk (accessed on 18 February 2018). [40]

Darling-Hammond, L. and A. Lieberman (2012), *Teacher Education Around the World : Changing Policies and Practices*, Routledge, Abingdon, https://www.routledge.com/Teacher-Education-Around-the-World-Changing-Policies-and-Practices/Darling-Hammond-LIEBERMAN/p/book/9780415577014 (accessed on 4 October 2018). [28]

Davies, H. (2007), "Academic advice to practitioners—the role and use of research-based evidence", *Public Money and Management*, Vol. 27/4, pp. 232-235. [35]

Deeble, M. and T. Vaughan (2018), "An evidence broker for Australian schools", *Centre for Strategic Education*, Vol. 150. [34]

du Plooy, L. et al. (2016), "Searching for research results to inform the design of an initial professional teacher education programme for the foundation phase: A systematic review", *South African Journal of Childhood Education*, Vol. 6/1, pp. 1-8, http://dx.doi.org/10.4102/sajce.v6i1.285. [22]

Ell, F. et al. (2017), "Mapping a complex system: what influences teacher learning during initial teacher education?", *Asia-Pacific Journal of Teacher Education*, Vol. 45/4, pp. 327-345, http://dx.doi.org/10.1080/1359866x.2017.1309640. [1]

European Commission (2017), *Networks for Learning and Development across School Education*, European Commission, Brussels. [18]

European Commission (2015), *Shaping career-long perspectives on teaching: A guide on policies to improve initial teacher education*, Education & Training 2020 - Schools Policy, Brussels, http://ec.europa.eu/dgs/education_culture/repository/education/library/reports/initial-teacher-education_en.pdf. [15]

European Commission/EACEA/Eurydice, E. (2017), *Support Mechanisms for Evidence-based PolicyMaking in Education (Eurydice Report)*, Publications Office of the European Union. [43]

Fazekas, M. and T. Burns (2012), "Exploring the complex interaction between governance and knowledge in education", http://www.oecd-ilibrary.org/education/exploring-the-complex-interaction-between-governance-and-knowledge-in-education_5k9flcx2l340-en. [3]

Gansle, K., G. Noell and J. Burns (2012), "Do Student Achievement Outcomes Differ Across Teacher Preparation Programs? An Analysis of Teacher Education in Louisiana", *Journal of Teacher Education*, Vol. 63/5, pp. 304-317, http://dx.doi.org/10.1177/0022487112439894. [32]

González-Sancho, C. and S. Vincent-Lancrin (2016), "Transforming education by using a new generation of information systems", *Policy Futures in Education*, Vol. 14/6, pp. 741-758, http://dx.doi.org/10.1177/1478210316649287. [10]

Grossman, P., K. Hammerness and M. McDonald (2009), "Redefining teaching, re-imagining teacher education", *Teachers and Teaching*, Vol. 15/2, pp. 273-289, http://dx.doi.org/10.1080/13540600902875340. [13]

Hammerness, K. and K. Klette (2015), "Indicators of quality in teacher education: Looking at features of teacher education from an international perspective", in *Promoting and Sustaining a Quality Teacher Workforce*, Emerald Group Publishing Limited, http://www.emeraldinsight.com/doi/abs/10.1108/S1479-367920140000027013. [12]

Hargreaves, A. and M. Ainscow (2015), "The top and bottom of leadership and change", *Phi Delta Kappan*, Vol. 97/3, pp. 42-48, http://dx.doi.org/10.1177/0031721715614828. [19]

Koedel, C. et al. (2015), "Teacher Preparation Programs and Teacher Quality: Are There Real Differences Across Programs", *Education Finance and Policy*, Vol. 10/4, pp. 508-534, http://dx.doi.org/10.1162/edfp_a_00172. [33]

Kools, M. and L. Stoll (2016), "What Makes a School a Learning Organisation?", *OECD Education Working Papers*, No. 137, OECD Publishing, Paris, https://dx.doi.org/10.1787/5jlwm62b3bvh-en. [8]

Louisiana Board of Regents (n.d.), *Teacher Preparation Data Dashboards & Fact Book*, https://regents.la.gov/divisions/planning-research-and-academic-affairs/academic-affairs/teacher-education-initiatives/teacher-preparation-data-dashboards-fact-book/ (accessed on 5 February 2019). [54]

MA DESE, M. (2016), *Educator Preparation: Program Approval Criteria List*, http://www.doe.mass.edu/edprep/evaltool/2017CriteriaList.pdf. [49]

MA DESE, M. (2016), *Program Approval Guidelines*, http://www.doe.mass.edu/edprep/ProgramApproval.pdf. [48]

Mandinach, E. and E. Gummer (eds.) (2018), *Building Capacity and Commitment for Data Use in Teacher Education Programs*, Routledge. [47]

Matachi, A. (2006), *Capacity Building Framework*, UNESCO - International Institute for Capacity Building in Africa, http://www.iicba.unesco.org/sites/default/files/Capacity%20Building%20framework.pdf (accessed on 29 November 2018). [6]

Nusche, D. et al. (2014), *OECD Reviews of Evaluation and Assessment in Education: Netherlands 2014*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264211940-en. [58]

OECD (2018), *Developing Schools as Learning Organisations in Wales*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264307193-en. [9]

OECD (2018), *Innovation Strategy for Education and Training*, http://www.oecd.org/education/ceri/innovationstrategyforeducationandtraining.htm (accessed on 5 December 2018). [37]

OECD (2018), *Strategic Education Governance - Project Plan and Organisational Framework*, OECD Centre for Educational Research and Innovation, Paris, http://www.oecd.org/education/ceri/SEG-Project-Plan-org-framework.pdf (accessed on 18 December 2018). [4]

OECD (2015), *Schooling Redesigned: Towards Innovative Learning Systems*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264245914-en. [16]

OECD (2013), *Innovative Learning Environments*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264203488-en. [17]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190658-en. [46]

OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, OECD Reviews of Tertiary Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264046535-en. [45]

OECD (2007), *Evidence in Education: Linking Research and Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264033672-en. [21]

Peck, C., C. Gallucci and T. Sloan (2010), "Negotiating implementation of high-stakes performance assessment policies in teacher education: from compliance to inquiry", *Journal of Teacher Education*, Vol. 61/5, pp. 451-463, http://dx.doi.org/10.1177/0022487109354520. [25]

Révai, N. and S. Guerriero (2017), "Knowledge dynamics in the teaching profession", in Guerriero, S. (ed.), *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264270695-4-en. [5]

Révai, N. and G. Kirkham (eds.) (2013), *The Art and Science of Leading a School*, Tempus Public Foundation, Budapest, https://tka.hu/docs/palyazatok/theartandscienceofleadingaschool_issuu_xs.pdf (accessed on 12 December 2018). [7]

Rhode Island Department of Education (n.d.), *Rhode Island Educator Preparation Index*, http://www3.ride.ri.gov/RIEdPrepIndex/ (accessed on 5 February 2019). [53]

Roberts-Hull, K., B. Jensen and S. Cooper (2015), *A New Approach: Reforming Teacher Education*, Learning First, Melbourne, Australia, http://www.learningfirst.org.au. (accessed on 2 October 2018). [60]

Sonmark, K. et al. (2017), "Understanding teachers' pedagogical knowledge: report on an international pilot study", *OECD Education Working Papers*, No. 159, OECD Publishing, Paris, https://dx.doi.org/10.1787/43332ebd-en. [50]

Tatto, M. (2015), "The role of research in the policy and practice of quality teacher education: an international review", *Oxford Review of Education*, Vol. 41/2, pp. 171-201, http://dx.doi.org/10.1080/03054985.2015.1017405. [38]

Tatto, M. et al. (2016), "The emergence of high-stakes accountability policies in teacher preparation: an examination of the U.S. Department of Education's proposed regulations", *Education Policy Analysis Archives*, Vol. 24/0, p. 21, http://dx.doi.org/10.14507/epaa.24.2322. [30]

TEMAG (2014), *Action Now: Classroom Ready Teachers*, Teacher Education Ministerial Advisory Group, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_print.pdf. [52]

TEMAG, T. (2014), *Action Now: Classroom Ready Teachers (Teacher Education Ministerial Advisory Group Final Report)*, Australian Department of Education, https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_accessible.pdf. [44]

Timperley, H. et al. (2007), *Teacher Professional Learning and Development Best Evidence Synthesis Iteration [BES]*, New Zealand: Ministry of Education, Wellington, http://educationcounts.edcentre.govt.nz/goto/BES (accessed on 11 October 2018). [41]

Toon, D. and B. Jensen (2017), *Teaching our Teachers: a Better Way - Developing Partnerships to Improve Teacher Preparation*, Learning First, Melbourne, http://learningfirst.com/wp-content/uploads/2018/03/2columnsITECoPPaper2PartnershipsFINAL17Nov17.pdf (accessed on 11 October 2018). [14]

Toon, D., B. Jensen and S. Cooper (2017), *Teaching Our Teachers: a Better Way - Continuous Improvement in Teacher Preparation*, Learning First, Melbourne, http://www.learningfirst.com. (accessed on 4 October 2018). [29]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [57]

Welsh government (2017), *Connecting Research and Teacher Education: Quality Enhancement for ITE Partnerships*, Education Directorate, Welsh Government,, http://learning.gov.wales/resources/browse-all/connecting-research-and-teacher-education/?lang=en. [51]

Wilson, S., R. Floden and J. Ferrini-Mundy (2001), *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, Center for the Study of Teaching and Policy, Washington DC, https://www.education.uw.edu/ctp/content/teacher-preparation-research-current-knowledge-gaps-and-recommendations (accessed on 4 October 2018). [27]

Annex A. Methodology of policy review

The review process consisted of the following main steps:

- **Country background report (CBR) and Review visit plan:** a 30-40 page report completed by the participating countries prior to the review visit based on the conceptual framework and detailed guidelines. Countries were also asked to complete three questionnaires relating to the review process and as part of ITP data collections. National co-ordinators selected schools, initial teacher education providers and other stakeholders (when relevant) based on predefined selection criteria.
- **Background documentation and guidelines:** The OECD Secretariat developed interview protocols to cover the six themes for each key stakeholder: officials in national ministries, officials in municipalities/states/boards of education, new teachers, experienced teachers, mentor teachers, second career teachers, former teachers, school boards, school managers, researchers in teacher education institutions, teacher educators, and teacher unions. The Secretariat also prepared ITP system maps drawn from NESLI data and key country-specific research, policy findings and data (including the CBR).
- **Selection of experts:** The OECD Secretariat selected experts based on their expertise in one or more of the OECD Teacher Education pathway themes, and appointed a critical friend (usually from within the OECD) to provide general policy insights and feedback on preparatory documentation.
- **Conducting the visit:** A team of four experts (two OECD and two international experts) visited each country over a period of four days. The review team conducted interviews during the site visits and identified the key SWOT of the ITP system under review.
- **Initial findings:** Initial findings were presented and discussed with national co-ordinators and Ministry officials on the fifth day of the review visit, or via webinar shortly afterwards. These findings consisted of a system-level SWOT policy diagnosis and context and key aspects for each of the six themes of the study. The OECD Review team adjusted findings in light of discussion and submitted the presentation to national co-ordinators as draft initial findings.

Annex B. Mapping initial teacher preparation system on the OECD Teacher Education Pathway

Figure A B.1. Teacher Education Pathway in Australia

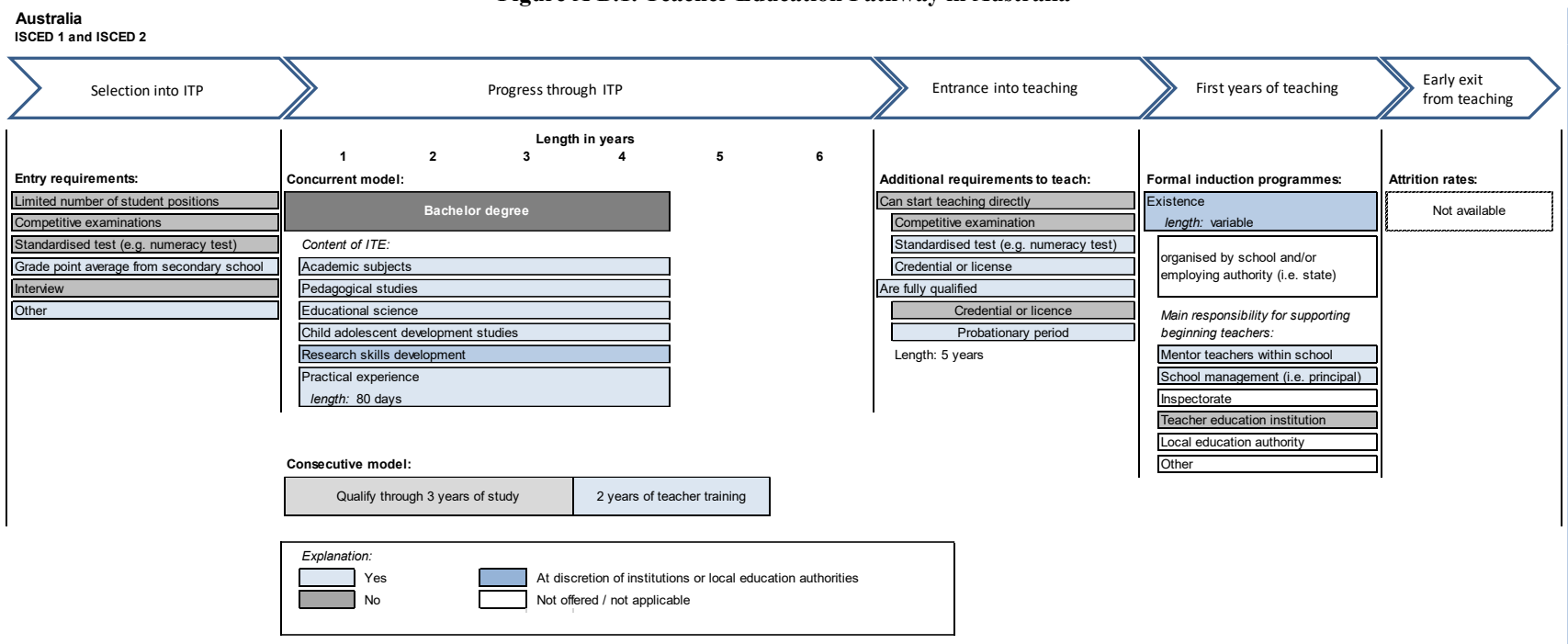
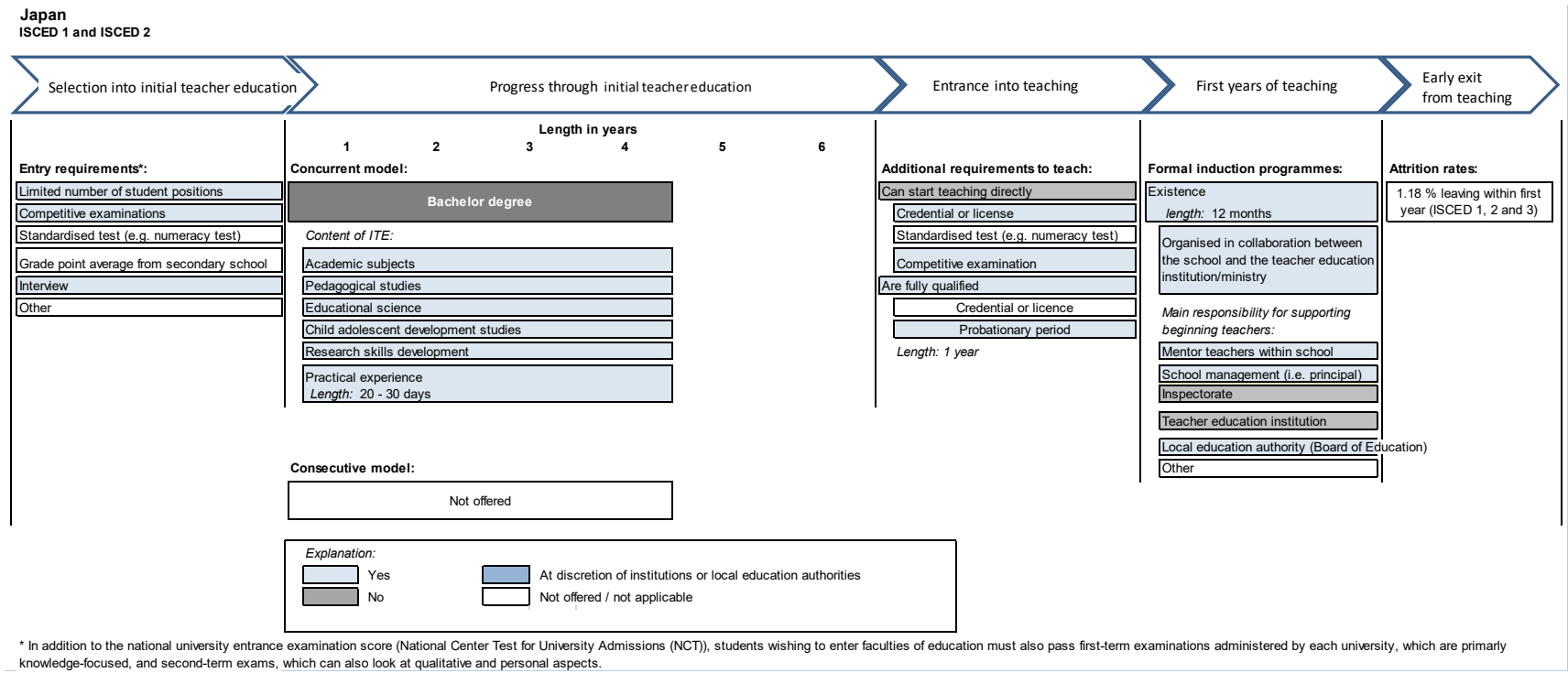


Figure A B.2. Teacher Education Pathway in Japan



* In addition to the national university entrance examination score (National Center Test for University Admissions (NCT)), students wishing to enter faculties of education must also pass first-term examinations administered by each university, which are primarily knowledge-focused, and second-term exams, which can also look at qualitative and personal aspects.

Figure A B.3. Teacher Education Pathway in Korea

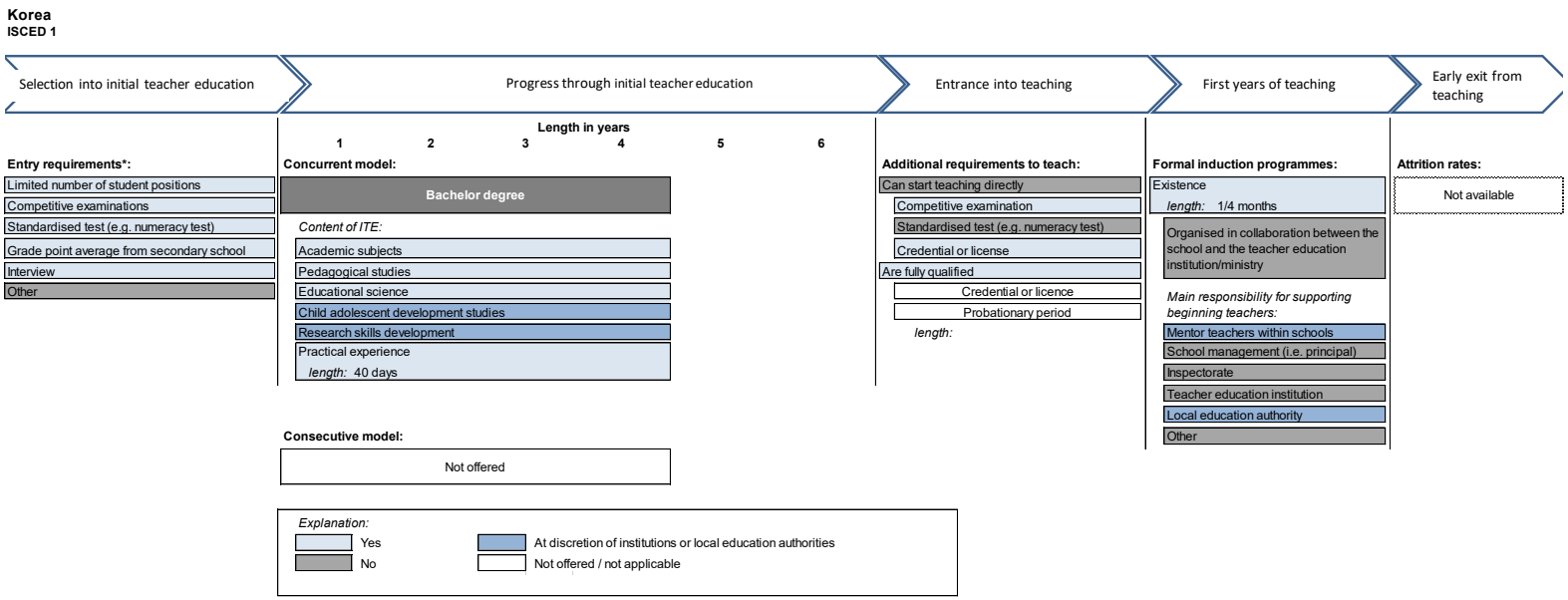
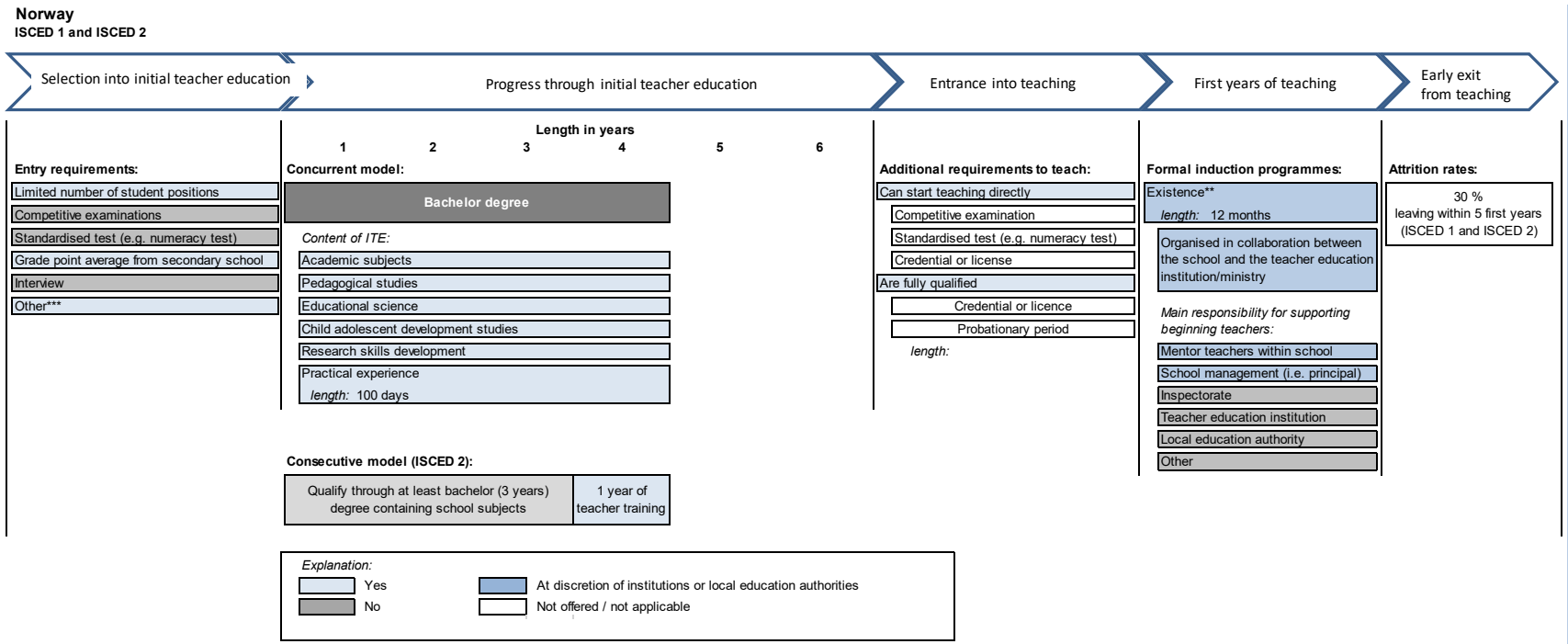
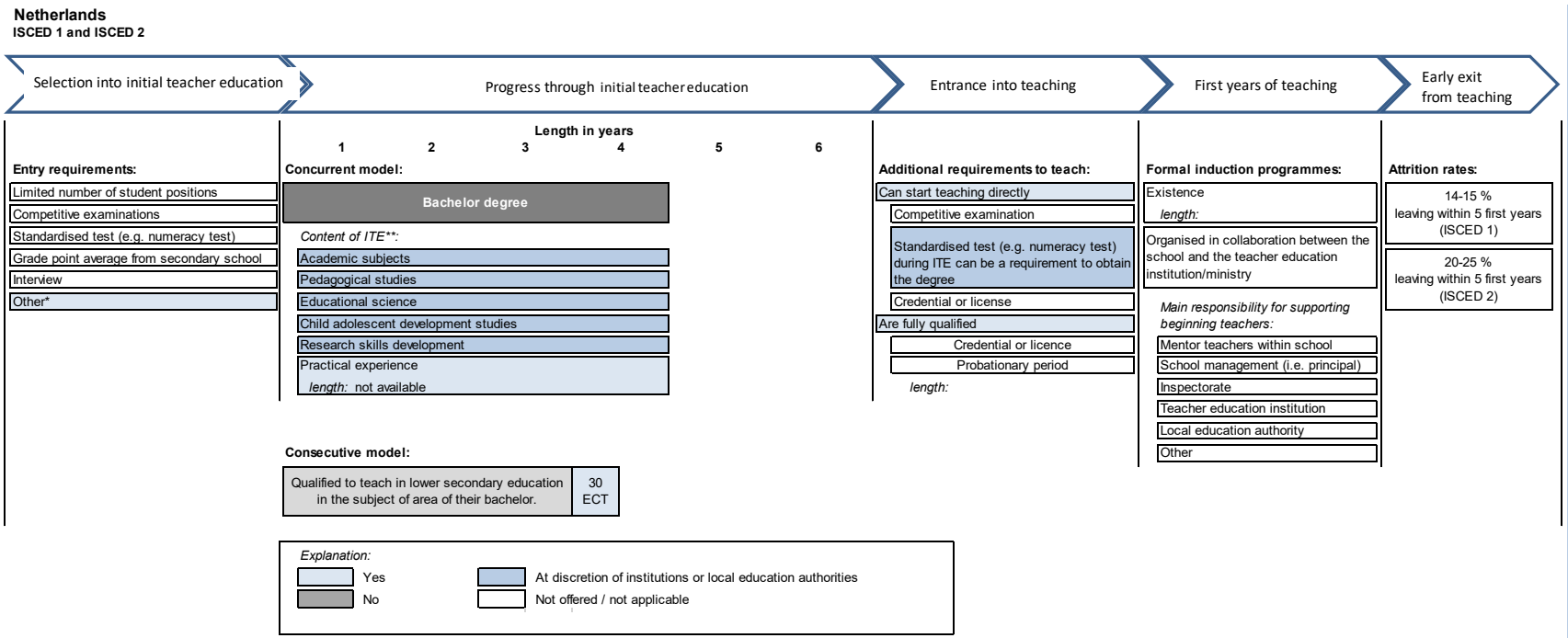


Figure A B.4. Teacher Education Pathway in Norway



*The most important/mainstream ITEs (Grunnskolelærerutdanningene (GLU)) are exactly 4 years at bachelors levels, as the model shows. Norway has at least 7 different ITEs: There are also ITEs that are 3 Years bachelors, and others that are 5 years masters.
**Mentoring of newly qualified teachers is not regulated by law, but has gradually become a regular arrangement in most municipalities in Norway, due to an agreement between the Ministry of Education and Research and the Norwegian Association of Local and Regional Authorities (KS) in 2009.
*** Students must have accomplished at least grade 3 in Norwegian and at least grade 4 in Mathematics, minimum course, from secondary education. Students are give grades 1-6 where 6 is for the best performing.

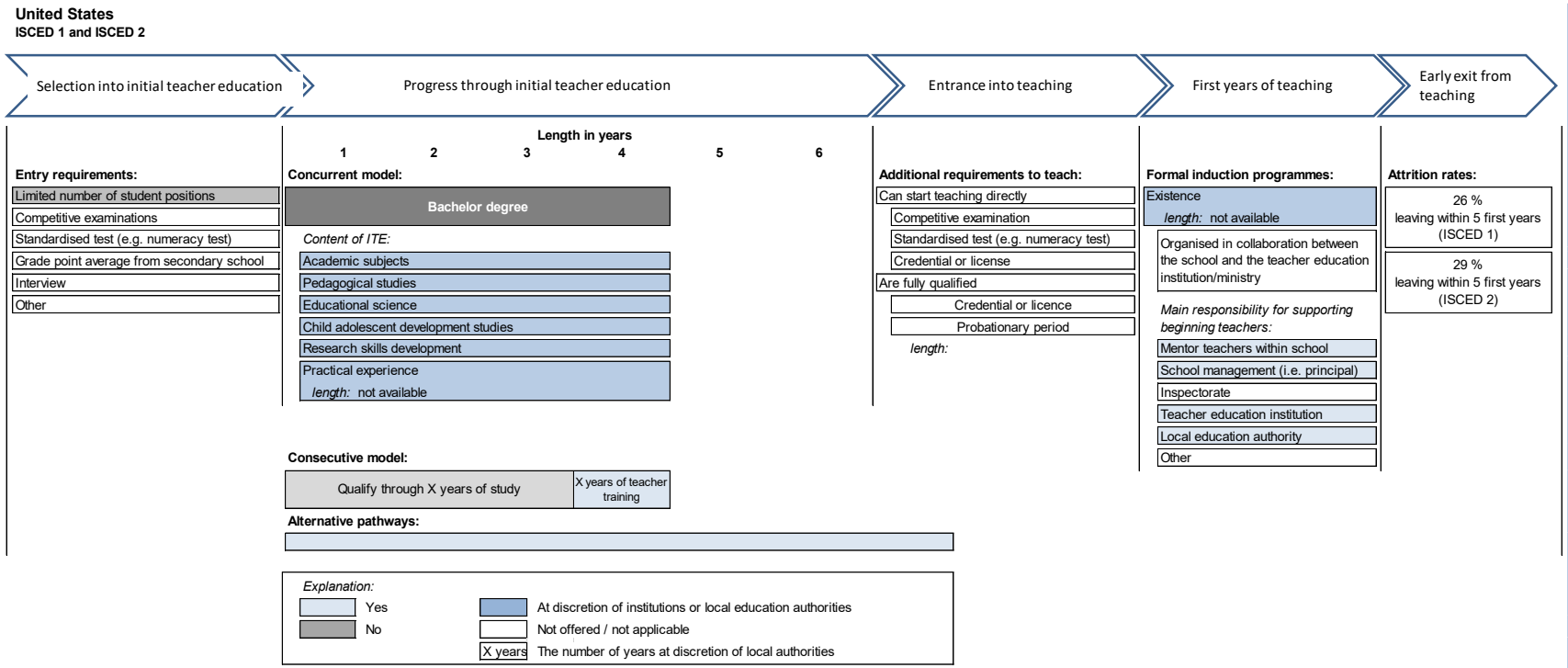
Figure A B.5. Teacher Education Pathway – Netherlands



*Teacher candidates entering initial teacher education for primary education (ISCED1) are required to have taken history, geography and nature and science in secondary education. Those who have not been examined in these subjects must take entry tests prior to starting the initial teacher education.

**There are no central guidelines on initial teacher education content. There is a general competence regulation for working as a teacher and teacher education institutions must integrate this into their programmes. ITP's have jointly made their own guidelines on what substantive knowledge minimal should be addressed in the different ITP's. These guidelines are called "knowledge bases". Many ITP's work with a central final test, also made together, to control this substantive knowledge. Every six years, ITE programme quality is checked by an independent accreditation organisation (NVAO).

Figure A B.6. Teacher Education Pathway in United States



Annex C. System level SWOT analyses in initial teacher preparation systems

Figure A C.1. A system-level SWOT - Australia

Strengths	Weaknesses
• Establishment and acceptance of a national agenda on teacher reform, especially challenging in a federated system, and in spite of the tight timeframe for reform • Strong co-construction of all frameworks and guidelines – developed over time and written in accessible and relevant language for schools, ITE providers, state authorities and agencies, etc. – led by a national body that is respected and is implementing reform • General and widespread commitment to reform – and willingness to change and improve initial teacher preparation – across all parts of the system.	• Demand-driven funding provides no incentive for institutions to recruit quality candidates, especially at undergraduate level. • Lack of workforce planning to drive the ITE system • Employment arrangements and structures impact on the attractiveness of the profession (e.g. large number of part-time and temporary contracts, lack of financial incentives for mid-career changers), deployment of new teachers (i.e. selection and assignment to remote schools and Homelands) and induction (i.e. teachers on temporary contracts less likely to ask for or receive support). • Weak feedback loops involving schools to improve ITE programmes, including selection practices, and provide early support for new teachers.
Opportunities	**Threats**
• Many reforms have great potential for system improvement: • Accreditation Standards to improve the quality of ITE programmes and classroom readiness of graduates • APST and HALT to build capacity at the school and systems levels as an input to school transformation • Teacher Performance Assessment to measure PCK and content knowledge of prospective teachers. • Potential to scale-up strong programmes and initiatives with solid research and evidence base system-wide, thereby contributing to international research and good practice in ITE • Use of new and developing national datasets and feedback for continuous programme improvement • Further development and dissemination of AITSL's strategic implementation plan for TEMAG reforms, with defined timeline, short-, medium- and long-term outcomes, indicators of success and consideration of unintended consequences of reform.	• Too many and overlaid reforms, with tight, unrealistic timeframes, may leave insufficient time for implementation or evaluation of impact, and provide little opportunity to reflect on lessons learned for future reforms. • The funding provided to the Teacher Education Cluster 4 may be leaving these courses underfunded compared to courses in more generously funded Clusters, which may be impacting on the quality and quantity of practical experience in the programmes. There is potentially a trade-off between providing Commonwealth funding to sustain the current number of entrants to ITE and funding the kind of programme to deliver higher quality, better trained, teachers. • Undeveloped linkages between ITE, induction and CPD, with a disproportionate focus on ITE as a panacea to improve teacher quality. • Supply and demand imbalance may threaten the quality agenda. • Short-term funding of some programmes, even those with evidence of impact.

Figure A C.2. A system-level SWOT - Japan

Strengths	Weaknesses
• Orientation to excellence • Culture of **collaboration, continuous** and **reflective practice** (e.g. lesson study) • Strong development of **subject knowledge** • •Status of profession: teacher as role model • Transparent processes and pragmatic approach.	• **Uneven quality** of initial teacher preparation programmes • **Getting balance right in terms of theory and practice.**
Opportunities	**Threats**
• **Capacity for regeneration and renewal** • **All reforms across the pathway work in concert** to reinforce each other and produce the maximum benefits for Japanese ITP, for example alignment of selection at entry and exit, initiatives for attractiveness and status of profession, teacher competency frameworks.	• **Demographic context** – many teachers retiring and low birth rates • Ability to **strike a balance** between (managed) autonomy and (free) control in universities, schools and boards of education – and inter-relationships between these stakeholders.

Figure A C.3. A system-level SWOT – Korea

Strengths	Opportunities
• Orientation to excellence • Capacity to implement deep and systemic change • Agreed purpose and value of education: a culture that "nurtures" children • Status of profession: teacher as societal role model • Wealth of talent: the "brightest and best" • Transparent processes and pragmatic approach (application, exams, certification, placement, career progression all clearly laid out) • Willing and able to use culture of evaluation to drive change.	• Disconnect between theory and practice • Undeveloped or lack of career pathways • Lack of connection between ITE, induction and CPD • Overreliance on summative examination: results do not always feed into a continuous improvement cycle • High level of competition can be counterproductive • Many institutional silos creating closed feedback loops and system, not connecting universities, MOE, Offices of Education, schools, etc.
Weaknesses	**Threats**
• Scaling up good practice rapidly • 4th Industrial Revolution discourse indicates a willingness to overhaul, update and modernise • Increasing willingness to include the voice of multiple actors (e.g., parents, students, communities) can allow for broadening the model of accountability • Long-term nature of governance with incremental and predictable cycles • Culture of seniority and respect.	• Fewer enrolments/low birthrate • High demand creates a high level of scrutiny of the process, meaning change and innovation is difficult. • Lack of research-informed practice and policy • Weak student voice • Lack of understanding and awareness about diversity • Culture of seniority remains prevalent and may hinder reform, for example mentoring systems and fast-track school principal promotion.

Figure A C.4. A system-level SWOT - Norway

Strengths	Opportunities
• High level of stakeholder input into policies, especially student voice • University accreditation system based on continuous improvement with strong consequences • Strong subject knowledge training with solid frameworks and standards for ITE content.	• Fragmentation across initial teacher education, induction and continuous professional development – resulting in an inconsistent approach to policies, strategies and practices in initial teacher preparation, e.g. not using teacher mentors across the pathway • Lack of agency, i.e. some providers do not understand where they can innovate and take responsibility • Lack of co-design of ITE programmes by schools and universities.
Weaknesses	**Threats**
• Continuously and collaboratively review the impact of ITE policies and approaches (e.g. enhanced selection criteria) at all levels (Ministry as well as local school-university feedback loops) to improve how new teachers are developed • Build on existing university-school partnerships (i.e. university schools) to deepen and scale co-design and responsibility for delivery of ITE programmes, and better connect teacher preparation to ongoing development • Build on existing research networks (e.g. Centres of Excellence) and new Master's students to conduct and disseminate research in schools and universities • Increase incentives for school leadership and mentoring support (e.g. Master's in school leadership, training for mentors & school principals).	• Reform fatigue • Lack of clarity of purpose, weak research base and limited understanding of possible implications of some reform (i.e. implementing 5-year Master's, mathematics entry requirement for primary school teachers, 1-year compulsory induction, the impact/ manageability of accommodating the reforms for small schools) • Lack of capacity in faculty, schools and programmes to deliver higher quality ITE through a 5-year Master's programme.

Figure A C.5. A system-level SWOT - Netherlands

Strengths	Weaknesses
• Strong collaboration and taking ownership across the system (as a result of the culture of autonomy and willingness) • Focus on improving the quality of ITP across the system, e.g. teacher knowledge base, accrediting partnerships • • Support for pilots and innovation, including financial support.	• Complexity of programmes, pathways and qualifications • Ensuring quality across the board • • Sustainability of projects funded in the short-term • • Schools and school boards feel they lack influence over initial teacher training.
Opportunities	**Threats**
• Scaling up and sustaining successful initiatives, e.g. partnerships • Expanding initiatives to link preparation, induction and ongoing professional development programmes.	• Teacher shortages undermine quality initiatives • Increasing inequities, if not addressed (e.g. between school boards, in access to pathways and two-tiered qualifications).

Figure A C.6. A system-level SWOT – United States

Strengths	Weaknesses
• **Current focus on initial teacher preparation,** both in research and policy, and commensurate investment • Realisation of the need to **improve programme quality**.	• Difficulties faced in a decentralised system to **scale up local innovations, build consensus and create a shared vision and values for the future.** • Few **incentives** or **levers** to stimulate system-level change.
Opportunities	**Threats**
• **Networks of role models for excellence.** In a highly diverse, autonomous and innovative system, there are some quality programmes, researchers, mentor teachers, school leaders and teachers that could work together share best practice, and build consensus to improve quality. Organisations like **CCSSO** can contribute to creating more cross-state networks. • **Use of data** to support candidates, providers and new teachers' professional growth and continuous development.	• **Lack of consensus on urgent issues to be addressed** (e.g. teacher shortage, teacher mobility, consistent teacher competency framework). • **Fragmented approach** to addressing issues along the teacher education pathway, excacerbated by differences between states, differences between districts and large number of providers.

Figure A C.7. Wales

Identified Needs	Strategy
Need National strategic research plan for education in Wales that impacts learning	Establish national education research council for Wales
Need to build up research capacity in education faculties	Require each HEI to co-construct a research agenda and implementation plan with school partners
Need to incorporate more subject-specific expertise into teacher training and research	Redefine the role of mentor teachers to create bridge between content knowledge in schools and HEIs
Lack of access to research findings	Curate, create and share research throughout HEIs and schools and provide teachers with the knowledge and skills to engage in research
Integration of theory and practice	a) National strategy for engaging all stakeholders in developing a common language on research and practice b) Maximising the potential of the research agenda included in the professional standards across the sector
Lack of a coherent system for developing and supporting those responsible for educating novices in school contexts	Establish a national approach to professional learning to include an explicit commitment to evidence-based co-teaching

Annex D. List of Promising Practices on *Teacher Ready*!

Attracting

1. Attracting teachers to schools in rural and remote areas in Australia/Australia, Promising practice 1
2. Recruiting highly qualified mature STEAM graduates to teaching in Australia/Australia, Promising practice 2
3. Competitive selection into higher education in Japan, coupled with diverse selection filters/Japan, Promising practice 1
4. Exploring the alignment of initial teacher education to the new national curriculum in Japan: Teaching for Active Learning/Japan, Promising practice 2
5. Attracting and developing teachers for the 4th industrial revolution in Korea/Korea, Promising practice 1
6. Employment-based route into senior secondary vocational education in Netherland/Netherland, Promising practice 1
7. Introducing a five-year master's degree for all teachers in Norway/Norway, Promising practice 1
8. Addressing teacher diversity in the United States through NYC Men Teach/United States, Promising practice 2

Selecting

1. Improving the quality of the selection process of teacher candidates in Australia/Australia, Promising practice 4
2. Exploring the alignment of initial teacher education to the new national curriculum in Japan: Teaching for active learning/Japan, Promising practice 2
3. Managing the oversupply of teachers using quality assessments/Korea, Promising practice 3
4. Increasing the quality of entrants to primary teacher education in the Netherlands/Netherlands, Promising practice 2

Equipping

1. The National Exceptional Teachers for Disadvantaged Schools Initiative in Australia/Australia, Promising practice 3
2. Clinical practice approaches in initial teacher education in Australia/Australia, Promising practice 5

3. Australian professional standards for teachers/Australia, Promising practice 6
4. Competitive selection into higher education in Japan, coupled with diverse selection filters/Japan, Promising practice 1
5. The use of lesson study to develop teachers in Japan/Japan, Promising practice 3
6. Collaboration between and within universities, boards of education and schools in Japan/Japan, Promising Practice 4
7. Transforming pedagogy in initial teacher education: Strategic support for innovation at Ewha Womans University in Korea/Korea, Promising practice 2
8. Managing the oversupply of teachers using quality assessments/Korea, Promising practice 3
9. Industry-developed professional standards for teacher educators in the Netherlands/Netherlands, Promising practice 4
10. Knowledge bases for initial teacher education in the Netherlands/Netherlands, Promising practice 6
11. Introducing a five-year master's degree for all teachers in Norway/Norway, Promising practice 1
12. Increasing specialist subject training and knowledge requirements for prospective and current teachers in Norway/Norway, Promising practice 2
13. Ownership and understanding of the National Teacher Preparation Guidelines in Norway/Norway, Promising Practice 3
14. Integrating knowledge and practice in teacher education in Norway/Norway, Promising practice 4
15. Professional learning based on systematic enquiry in the Fern Federation in Wales/Wale (UK), Promising practice 1
16. Towards a research-informed, evidence-based reform agenda in initial teacher education in Wales/Wale (UK), Promising practice 2
17. ITE programme accreditation in Wales as a means to strengthen research-informed initial teacher education programmes/Wales (UK), Promising practice 3
18. Clinical faculty in the United States/United States, Promising practice 3
19. TeachingWorks: A practice-based approach for preparing teachers in the United States/United States, Promising practice 4
20. Cross-state networks for the improvement of teacher education: Deans for Impact/United States, Promising practice 6

Quality

1. New accreditation for Initial Teacher Education Programmes in Australia/Australia, Promising practice 7
2. Collaboration between and within universities, boards of Education and schools in Japan/Japan, Promising Practice 4
3. Annual reporting of data on initial teacher education programmes in Japan/Japan, Promising practice 7
4. Schools and teacher education institution co-creating ITE programmes in the Netherlands/Netherlands, Promising practice 3
5. University accreditation system: Encouraging a culture of quality in the Netherlands/Netherlands, Promising practice 5
6. The role of the Norwegian Agency for Quality Assurance in Education/ Norway, Promising practice 5
7. Center for Professional learning in Teacher Education (ProTed): Promoting Innovation, research strategic partnerships and sharing of best practice in initial teacher education/Norway, Promising practice 6
8. Massachusetts' review and approval of ITE programmes/United States, Promising practice 5

Certify

1. Creating a pipeline to teaching in Tasmanian government schools: From the University to hire/Australia, Promising practice 8
2. Hiring the best teachers: The role of the teachers' Employment Examination in Japan/Japan, Promising practice 5

Supporting

1. The use of lesson study to develop teachers in Japan/Japan, Promising practice 3
2. Hiring the best teachers: The role of the teachers' Employment Examination in Japan/Japan, Promising practice 5
3. Mandatory 1-year induction for new teachers in Japan/Japan, Promising practice 6
4. Professional learning communities and master teacher networks: Building collective responsibility for the profession and for supporting new teachers/Korea, Promising practice 4
5. Pre-employment training for new teachers in Gyeong-gi Province in Korea/Korea, Promising practice 5
6. Introducing a five-year master's degree for all teachers in Norway/Norway, Promising practice 1

7. Increasing specialist subject training and knowledge requirements for prospective and current teachers in Norway/Norway, Promising practice 2
8. Ownership and understanding of the National Teacher Preparation Guidelines in Norway/Norway, Promising Practice 3
9. Teacher residencies featuring the Centre for Inspired Teaching/United States, Promising practice 1
10. Clinical faculty in the United States/United States, Promising practice 3
11. Cross-state networks for the improvement of teacher education: Deans for Impact/United States, Promising practice 6

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A Flying Start

IMPROVING INITIAL TEACHER PREPARATION SYSTEMS

Addressing teacher education in all its complexity is fundamental to ensuring that all students reach their potential in today's increasingly diverse classrooms and rapidly changing environment. This report provides insight into key features of selected teacher preparation systems by analysing the information collected in the OECD Initial Teacher Preparation (ITP) study. The ITP study investigated the policy environments of the first phase of continuous teacher learning in seven countries to identify challenges, strengths and innovations: Australia, Japan, Korea, the Netherlands, Norway, the United States and Wales (United Kingdom).

A Flying Start: Improving Initial Teacher Preparation Systems describes the challenges of designing and sustaining initial teacher preparation systems and proposes strategies for different levels of the system (policy, teacher education institutions and schools), based on both international evidence and practices identified in the study. The report can therefore act as a resource for policy makers, teacher educators, educational leaders, teachers and the research community.

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