Chapter 3. Distributing teachers, school leaders and other school staff effectively

This chapter analyses the effective and equitable staffing of schools. All schools need competent teachers, school leaders and other staff to ensure a quality student experience. Schools however vary in their location, the student population they serve and how they are organised. As a result, they may require a different mix of staff that fits their particular context. The chapter begins by describing potential challenges in ensuring an adequate supply of high-quality staff, before discussing approaches to managing resources for the staffing of schools. It then discusses the recruitment of staff, highlighting the potential of collaboration between schools and authorities for the effective matching of staff with organisations. Finally, the chapter highlights the role of within-school sorting and the ways in which staff in schools work together to ensure high-quality teaching for all students.

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.

All schools need competent teachers, leaders and professional support staff to ensure a quality student experience. Schools, however, vary in their geographical location, the students and community they serve, and their organisation (e.g. specific curricular programmes and subject areas they offer at particular levels of school education). Different schools may therefore require a different mix of staff in terms of type, numbers, experience, and qualifications to support student learning and development.

This chapter analyses the effective and equitable staffing of schools which, as conceptualised in this chapter, entails the management and use of resources to create positions for employment (that is the contracting of staff) and the recruitment or hiring of specific candidates into these positions. The chapter begins with the overall supply of high-quality staff that can be recruited and employed, before discussing the resource management dimension of school staffing. It then analyses responsibilities and processes for the recruitment of staff into particular positions, highlighting the potential of collaboration between schools and education authorities for the effective matching of staff with organisations. Finally, the chapter considers the role of within-school sorting and the ways in which staff in schools work together to ensure high-quality teaching for all students (Kraft et al., 2015[1]; Little and Bartlett, 2010[2]).

Shortcomings in the staffing of schools can harm both schools and students. To give a flavor of the complexities of staff distribution, the late hiring of teachers or the lack of a replacement in case of another teacher's sick or training leave can result in lost learning time for students. A shortage of teachers with specific expertise, such as advanced mathematics, can prevent schools from offering particular courses or require a teacher to instruct in a subject for which they have not been qualified. Since shortcomings in the distribution of staff may affect some schools more than others, they may also lead to inequities in opportunities for learning between students.

Particular country contexts will influence the distribution of staff. Large countries with challenging geographies or large regional disparities in socio-economic development, for example, may find it more difficult to ensure an equitable and efficient staff distribution than small and homogeneous countries (Luschei and Chudgar, 2017[3]). The chapter concludes with a series of policy options that school systems may consider valuable, while recognising that local policies and implementation will need to be adapted to the particular needs of a school system.

3.1. Inequities in the distribution of teachers and school leaders between schools

The quantity and quality of staff working with students can vary across schools and geographical areas leading to inequities in the quality of teaching and learning. Many countries in fact struggle with inequities in the distribution of staff across schools, as a rich knowledge base has established, most notably for the case of teachers. An OECD report on effective teacher policies reviewed the international evidence on teacher sorting and selection (OECD, 2018[4]). The review found an important body of research in the United States where inequities in the distribution of teachers have been documented at least since the early 2000s. Teachers with weaker qualifications or without certification have been found to be more likely to teach in disadvantaged schools, for example (Goldhaber, Lavery and Theobald, 2015[5]; Jackson, 2009[6]; Boyd et al., 2008[7]; Murnane and Steele, 2007[8]; Clotfelter, Ladd and Vigdor, 2005[9]; Lankford, Loeb and Wyckoff, 2002[10]).

The report found similar emerging evidence for other countries, such as Chile, England (United Kingdom), France, Italy, Norway and Turkey (Abbiati, Argentin and Gerosa, 2017[11]; Allen, Burgess and Mayo, 2017[12]; Cabezas et al., 2017[13]; Combe, Tercieux and Terrier, 2016[14]; Özoğlu, 2015[15]; Bonesrønning, Falch and Strøm, 2005[16]). The UNESCO Global Education Monitoring Report for 2013/14 similarly identified inequities in the distribution of teachers in lower income countries (UNESCO, 2014[17]) as did a report for India, Mexico and Tanzania (Luschei and Chudgar, 2017[3]).

An analysis of data from the OECD Programme for International Student Assessment (PISA) 2015 found that in more than a third of countries and economies participating in the assessment, teachers in the most disadvantaged schools were less qualified or experienced than those in the most advantaged schools (OECD, 2018[4]).

Inequities in the distribution of teaching staff were also evident in a number of OECD review countries. The reviews of Colombia, Lithuania and the Slovak Republic, for instance, found inequities in the distribution of teachers for rural and small communities (Radinger et al., 2018[18]; Santiago et al., 2016[19]; Shewbridge et al., 2016[20]).

There is less evidence on inequities in the distribution of leadership staff, but some studies suggest that principals may sort into schools so that, similar to teachers, principals with less experience and qualifications work in more challenging contexts (Loeb, Kalogrides and Horng, 2010[21]). Within the OECD review, the study of Uruguay identified concerns about inequities in the distribution of teacher leaders (staff who fulfil mainly administrative, but also some pedagogical tasks) across schools. Socio-economically advantaged schools had a larger number of such teacher leaders (Santiago et al., 2016[22]). Such inequities in the distribution of leadership staff are a concern given research suggesting that effective school leadership can play a particularly important role in low-performing and disadvantaged schools (Branch, Hanushek and Rivkin, 2012[23]; Louis et al., 2010[24]).

The distribution of staff – who represent the largest part of education expenditures – influences the amount of financial resources a school and a student receive. Since the salaries of teachers and school leaders are often tied to experience and qualifications as analysed in Chapter 2, the sorting of staff with different types of qualifications and years of experience can also result in inequities in resource flows between schools, with advantaged schools receiving more funding than disadvantaged schools, for example.

When considering inequities in the distribution of school staff, one also needs to consider other features of school education, such as the degree of school choice and student sorting across schools (for an in-depth discussion of these issues, see OECD (2018[25])). Where school choice leads to segregation, this sorting of students may interact with the sorting of staff into different schools. Similarly, the extent of private provision and how it influences the labour market and distribution of staff needs to be considered (see Box 3.1).

Box 3.1. Private school provision and teacher labour markets

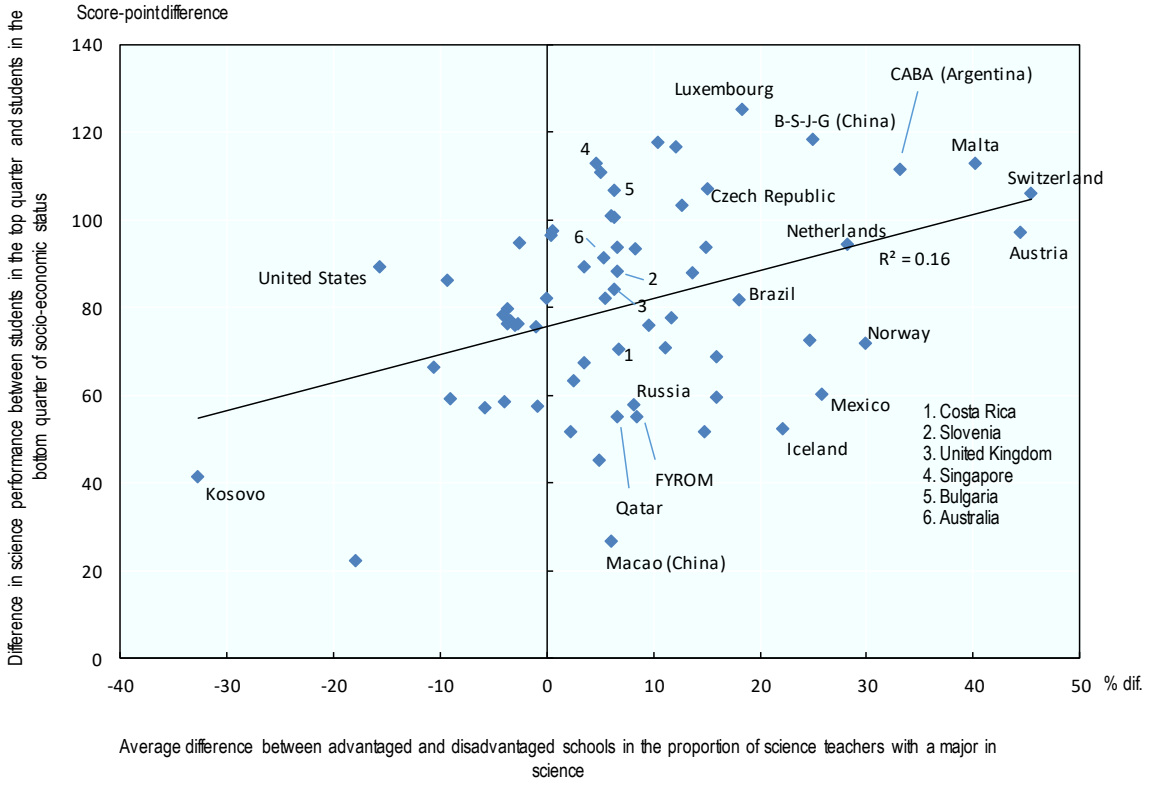
It is often assumed that private schools may attract high-quality teachers away from public schools. Saying this, Hensvik (2012[26]) notes that private schools' hiring behaviour in Sweden differs from that of public schools. While they attract teachers from a different pool than public schools, her results also show that these teachers are from the higher end of the skill distribution. Behrman et al. (2016[27]) simulate the teacher labour force using data from Chile to show that while private schools do attract higher quality teachers, the private school sector in the school system increases the overall pool of teachers and of those of higher quality. This may also benefit public schools and improve general educational attainment. As such, competition in the school system can have ambiguous effects on the teacher labour market, though overall there is some consensus that private schools attract high-quality individuals.

Competition from private schools for teachers may also affect teachers' salaries and the distribution of education expenditure as the public school sector may have to compete to attract and retain teachers by increasing their salaries. In empirical studies for Sweden and the United States, competition from private schools raised teachers' salaries by 0.5-3%, and this effect was larger for new teachers and for teachers who taught "hard-to-staff" subjects (Hensvik, 2012[26]; Jackson, 2012[28]). An increase in teachers' salaries may be a good thing if teachers are of a higher skill level. However, as a higher expenditure on salaries usually means a reduction of expenditure elsewhere, this cost may simply retain the same teachers or come at the cost of lower investments in other areas that also affect student outcomes. As such, the effect on student outcomes is unclear.

Inequities in the distribution of teachers and school leaders also raise questions about the extent to which these inequities contribute to achievement gaps between students. Cross-country correlations from the PISA 2015 suggest that gaps in student performance related to socio-economic status are wider when fewer qualified and experienced teachers work in socio-economically disadvantaged schools (see Figure 3.1) (OECD, 2018[4]). However, a study from the United States found that a more equitable distribution of teachers would not substantially reduce student achievement gaps between high- and low-income students (Isenberg et al., 2016[29]), which highlights the complexity of addressing student disadvantage (OECD, 2016[30]).

Figure 3.1. Relationship between socio-economic differences in science performance and in teacher qualifications, 2015

Socio-economic disparities in science performance and differences between advantaged and disadvantaged schools in teacher qualifications



Notes: Countries and economies named on the chart show a significant difference between advantaged and disadvantaged schools in the proportion of science teachers with a major in science. Countries/economies where the difference is not significant are Albania, Algeria, Belgium, Canada, Chile, Colombia, Denmark, the Dominican Republic, Estonia, Finland, France, Georgia, Germany, Greece, Hong Kong (China), Hungary, Indonesia, Ireland, Israel, Jordan, Korea, Latvia, Lebanon, Lithuania, Moldova, Montenegro, New Zealand, Peru, Poland, Portugal, Romania, the Slovak Republic, Spain, Sweden, Chinese Taipei, Thailand, Trinidad and Tobago, Tunisia, Turkey, the United Arab Emirates, Uruguay and Viet Nam.
Source: OECD (2018), *Effective Teacher Policies: Insights from PISA*, OECD Publishing, Paris, https://doi.org/10.1787/9789264301603-en, Figure 3.13.

StatLink https://doi.org/10.1787/888934026430

3.2. Supply of teachers, school leaders and other school staff

Providing a high-quality and sufficiently large pool of staff that are available for recruitment and employment is the first step for making sure that schools have the staff they need. Difficulties in the overall supply of staff can result in challenges for the effective staffing of schools, and ultimately the quality of teaching and learning. For instance, it can be difficult to provide high-quality mother tongue instruction to minority students if few teachers with knowledge of a minority language enter the profession and if those that do have not been effectively prepared (Luschei and Chudgar, 2017[3]).

In Chile, indigenous students can be taught by "traditional teachers" from their own communities through a Programme for Intercultural Bilingual Education (*Programa de Educación Intercultural Bilingue*, PEIB) that seeks to maintain and develop indigenous languages and culture. Traditional teachers, however, often have low levels of education and often no pedagogical training which may influence the quality of instruction they are able to deliver (Santiago et al., 2017[31]).

More generally, the nature of the pool of staff (e.g. in terms of numbers and qualifications) is shaped by the attractiveness of working conditions (Chapter 2) and professional learning systems (Chapter 4). Broader labour market conditions, such as alternative job opportunities and job security, have been found to influence the supply of new teachers (Nagler, Piopiunik and West, 2015[32]), as have been education reforms linked to accountability and job security (Kraft et al., 2018[33]).

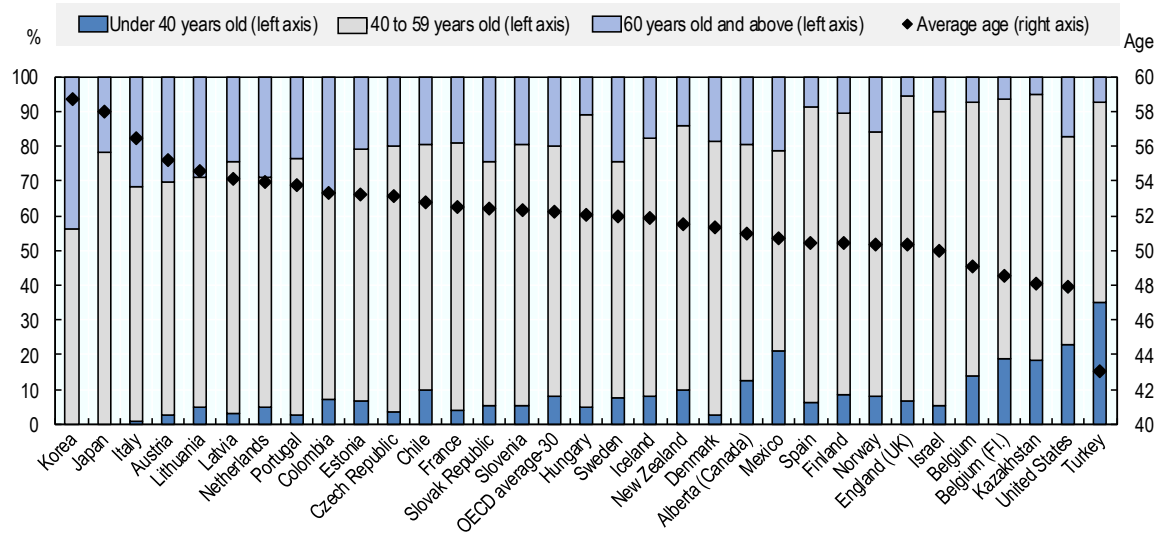
Many countries grapple with cyclical imbalances between the supply of and demand for teachers. Some school systems may find it difficult to replace a large number of teachers that are retiring or leaving the profession for other reasons, or to recruit new teachers to keep up with rising student enrolment. In others, initial teacher education may fail to provide sufficient new teachers. Teacher education may not attract sufficient candidates leaving school, student teachers may drop out before completing their teacher preparation (e.g. Denmark and Uruguay) or decide not to take up teaching after completing their studies (Nusche et al., 2016[34]; Santiago et al., 2016[22]). As a result, some countries report currently experiencing serious general shortages of teachers (e.g. Germany and Sweden) (Klemm and Zorn, 2017[35]; Sveriges Kommuner och Landsting, 2018[36]).

Other countries currently face the opposite problem of having to adjust the overall number of teachers to declining enrolment (e.g. Lithuania) (Shewbridge et al., 2016[20]), or with teacher education institutions releasing too many graduates into the market. Shortages and oversupply however typically not only go in cycles but co-exist, as teachers are unevenly distributed across subjects and geographical areas. There are often shortages for specific subjects (e.g. mathematics or natural sciences), specialisations (e.g. special needs) and locations (e.g. rural areas or disadvantaged urban neighbourhoods).

Various school systems find it also difficult to match supply and demand for school leaders. A number of OECD review countries are facing difficulties in filling school leadership positions, and this is likely to worsen where the school leadership profession is ageing. In Austria, Colombia, Italy and Korea, more than 30% of lower secondary principals are nearing retirement (at age 60 or above), as reported for the OECD Teaching and Learning International Survey (TALIS) 2018 (see Figure 3.2) (OECD, 2019[37]). School leadership is often not attractive given heavy workloads, a lack of adequate support and remuneration and uncertain career advancement prospects (see Chapter 2). School leadership in primary education and smaller rural schools may be even less attractive as there are fewer resources and administrative support to work with and as school leaders may be responsible for management and leadership while carrying a reduced teaching load.

Figure 3.2. Principals' age (ISCED 2), 2018

Percentage of principals, by age group and average age of principals



Notes: Countries and economies are ranked in descending order of the average age of principals. The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.

Source: OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en, Figure I.3.2.

StatLink https://doi.org/10.1787/888934026449

It is essential to take into account changes to framework conditions affecting supply or demand, and to then reflect this in initial preparation and continuing professional learning. For supply, this includes policies related to retirement age and working time, such as teaching load requirements or part-time work, among others. For demand, this refers to changes to students' learning time (e.g. full-day schooling), class size limits or curriculum reforms. In Ireland, for example, new curriculum initiatives related to computer science; science, technology and mathematics (STEM); and foreign languages together with an increase in student numbers in secondary education have created challenges for the adequate supply of qualified teachers (The Teaching Council, 2015[38]).

Also for professional support staff, school systems may experience supply challenges. For the case of school psychology, an analysis of available data in the United States suggests a continued, although likely declining, shortage of school psychologists, which may also limit the field's capacity to deliver or support more comprehensive services beyond needs assessments (Castillo, Curtis and Tan, 2014[39]). As the study highlighted, framework conditions like changes in legislation, funding or service delivery models may have an important impact on supply and demand.

In Estonia, shortages of specialised support staff were found to limit educational opportunities for children with special educational needs (SEN) (Santiago et al., 2016[40]). As for teachers, broader framework conditions affect demand and supply. In countries like

Austria, the Czech Republic and Denmark, extended learning time policies and the inclusion of students with special educational needs (SEN) have changed the need for different types of staff working in schools throughout the school day (see Chapter 1) (Nusche et al., 2016[41]; Nusche et al., 2016[34]; Shewbridge et al., 2016[42]).

The next sections discuss the role of forecasting mechanisms to steer the overall supply and composition of the teacher population and strategies countries have pursued to alleviate shortages or manage oversupply.

3.2.1. Forecasting the need for and supply of teachers

While general labour market monitoring often provides some information on the balance between teacher supply and demand, a number of countries have specific mechanisms to forecast the need and supply of teachers in school education.

Responsibilities

Forward planning of the overall supply and demand of teachers is typically carried out at higher levels of administration, even where other education authorities or schools are responsible for employing their staff. Information from such forward-planning processes can then provide the basis for centrally steering the number of new teachers and adjusting competency profiles to the changing needs of schools (e.g. through changes to entry requirements or investments in initial teacher preparation and professional development).

In federal systems, individual states are typically responsible for forecasting and planning teacher supply and demand for their system. In the United States, for example, states have developed teacher supply and demand reports or funded related task forces in response to requirements set by their state legislature (Behrstock-Sherratt, 2016[43]). In Austria, responsibilities for teacher employment, monitoring and data management have been split between federal and provincial authorities for the different school types that they are responsible for. As the OECD review found, this made forecasting and planning challenging and required substantial co-ordination, with no authority assuming responsibility for teacher supply for the school system as a whole (Nusche et al., 2016[41]).

Some federal systems have made efforts to harmonise available data and to making them available on a national level:

- In Australia, the Australian Institute for Teaching and School Leadership has been tasked to implement an Australian Teacher Workforce Data Strategy for 2022. This strategy seeks to combine existing data on initial teacher education (such as the national Initial teacher education data report series with data on initial teacher education applicants, students and graduates) and the teaching profession to provide a comprehensive picture at the national level, enable supply pipeline modelling for workforce planning and increase the understanding of teacher career trajectories (AITSL, 2018[44]).
- In Germany, individual states collect data on the demand and supply of teachers within their jurisdiction, while the Standing Conference of the Ministers of Education and Cultural Affairs combines these data into a national forecast (KMK, 2018[45]).

- In Austria, some of the above-mentioned concerns have been addressed since the review through the introduction of a uniform personnel data management system which records information on the number of students and classes, and teachers' subjects, classroom assignments and tasks that are part of their teaching load (BMBWF, 2019[46]).

In school systems with dedicated regulatory authorities for the teaching profession, these authorities may play a leading role in forward planning. In Ireland, the Teaching Council (the country's professional standards body for teaching) has within its remit to advise the education ministry on teacher supply issues. Between 2014 and 2015, the council led a technical working group to inform future planning and develop a teacher supply model (The Teaching Council, 2015[38]).

In the province of Ontario (Canada), the College of Teachers (the province's self-regulatory body of the teaching profession), supports forecasting and steering with information on the demographic characteristics of the current workforce. The college surveys its members on an annual basis and the resulting report Transitions to Teaching provides information on teachers' initial and additional qualifications earned throughout their career. Based on these data, the province can anticipate teacher qualification needs and gear admissions accordingly (Ontario College of Teachers, 2018[47]).

As both cases illustrate, higher education authorities may also be involved in monitoring and forecasting. In Ireland, the technical working group included representatives of the Higher Education Authority, while in Ontario, the province's Higher Education Quality Council provides research and policy advice, including on labour market trends and outlooks for teaching (HEQCO, 2019[48]; The Teaching Council, 2015[38]).

Processes

Forward planning can provide information for the short, medium or long term and use different types of data to forecast supply and demand. Given the time it can take for measures to steer supply to take effect, forward planning ideally takes place for the medium to long term (European Commission, EACEA and Eurydice, 2018[49]). Data that are used for forecasting may answer questions such as those related to students' success in finding a job, the number and qualifications of teachers, out-of-field teaching, teaching loads and types of contract, or teachers intending to retire or leave the profession.

Based on a report by Eurydice, data in Europe most often relate to retiring teachers, teacher demographics, teachers by taught subject(s) and teachers leaving the profession (other than for retirement reasons). The majority of European countries also use data on the likely demand for teachers, which is mostly based on student population growth projections. Many countries go further by using data on the subjects that these teachers will need to teach, thus having a clearer picture of the type of investment required in initial teacher education. Although data on prospective teachers is used less often, nearly half of the countries take into account data on the number of initial teacher education students and graduates by specialisation. Such data on student teachers is however not straightforward to use as it is difficult to predict whether or when graduates will subsequently enter the teaching profession (European Commission, EACEA and Eurydice, 2018, pp. 24-27[49]).

The size of school systems and the teaching profession make it difficult to forecast and steer the teacher labour market effectively, and the persistence and cyclical nature of shortages and oversupply also raises questions about forward-planning processes and the effectiveness of policy responses. The Eurydice report found that "it is interesting to see

that many education systems face similar challenges with regard to teacher supply and demand, whether they carry out forward planning or not" (European Commission, EACEA and Eurydice, 2018, p. 31[49]).

In terms of forecasting mechanisms, there are questions about the right conceptualisation and definition of teacher supply issues (e.g. acceptable levels and benchmarks of teacher shortage and attrition; choice of indicators to describe teacher shortages, such as number of applicants per vacancy, applicants interviewed, share of school leaders reporting shortages). Lastly, there is a question about the presentation of complex data in a digestible and actionable way (Behrstock-Sherratt, 2016[43]).

3.2.2. Strategies to address specific challenges related to teacher shortages

Depending on the particular challenges of a country, education authorities, teacher education institutions and schools may take specific steps for the long term or the short term, within broader efforts to make teaching attractive as highlighted in Chapter 2.

Long-term strategies

For the long term, strategies can target initial teacher education – both institutions and student teachers – and practicing teachers. For institutions, this entails the regulation of programmes and the funding of study places. Initial teacher education needs to be properly scaled. Adequate regulatory frameworks for teacher education institutions and the programmes they offer facilitate the monitoring and steering of the potential supply of teachers from initial teacher education. Where regulations are weak, more or less teachers may be being prepared than are actually needed, few new teachers may be available for scarce fields and too many for already saturated areas (Ávalos, 2008[50]).

The cases of Denmark and Portugal illustrate the role of funding for initial teacher education. In Denmark, higher education is funded based on student numbers, which provides a strong incentive for teacher education institutions to enrol a large number of students. At the time of the review, the number of study places had reportedly not been adjusted sufficiently to declining demand, and institutions enrolled student teachers that were not adequately prepared for their studies. Changes to admissions procedures described below reportedly helped to address these concerns (Nusche et al., 2016[34]). In Portugal, on the other hand, the universalisation of basic education in the 1980s resulted in shortages, which were countered with an expansion of higher education institutions offering education degrees and the certification of large numbers of new teachers (Liebowitz et al., 2018[51]).

The funding and regulation of initial teacher education also has a role to play for preparing teachers for particular high-need areas. Research from different contexts suggests that teachers prefer to work close to their homes, families and friends, even when they gain their initial teaching qualification far from home (Prost, 2013[52]; Jaramillo, 2012[53]; Reininger, 2012[54]; Barbieri, Rossetti and Sestito, 2011[55]).

For example, Boyd et al. (2005[56]) found that 85% of new teachers who entered public school teaching in New York State between 1999 and 2002 took their first job in schools located within 40 miles of their hometowns. Women who make up a large share of the teaching profession in many countries have been found to be more likely to prefer working close to home and within their own communities (Engel and Cannata, 2015[57]). This research suggests that teacher labour markets are geographically relatively small and the pool of prospective teachers available to work in a given school is rather limited.

In rural and remote areas, "Grow your own" strategies can therefore play an essential role for meeting the demand for teachers (Echazarra and Radinger, 2019[58]). In Uruguay, regional teacher education institutions (*Centros Regionales de Profesores*, CERP) were created in the late 1990s across the country to widen access to teacher education and increase teacher supply for an expanding secondary system (Santiago et al., 2016[22]). In Colombia, higher teaching schools (*Escuelas Normales Superiores*, ENS) play an important role in supplying teachers for pre-primary and primary education in more rural parts of the country (Radinger et al., 2018[18]). And in Mexico, Leaders for Community Education play an important role as learning facilitators in educational models operated by a dedicated agency (*Consejo Nacional de Fomento Educativo*, CONAFE) to provide education to very small and remote communities (Echazarra and Radinger, 2019[58]).

For individual student teachers, policy may consider admission processes and financial (and other) support. Admission processes may help students in the decision to enrol in initial teacher education and help reduce drop-out. In Denmark, the application process to initial teacher education programmes underwent some changes to identify students who potentially would have difficulty completing their programme. Reportedly, this has somewhat reduced the dropout rate in initial education (Nusche et al., 2016[34]), although it may also have led to shortages in specific areas (e.g. rural parts of the country).

Support, for example in the form of scholarship programmes, may help attract students into particular areas of shortages such as specific curriculum expertise or help students complete their studies and again address issues of drop-out of initial teacher education. In the Netherlands, financial incentives, such as scholarships and subsidies, are provided for students in shortage subjects such as languages and science to enter teacher education (OECD, 2019[59]). Similarly, in the Slovak Republic, a scholarship scheme has been established to increase the supply of students for specific fields, including physics, chemistry, mathematics, information and communication technology (ICT), geography and biology (Santiago et al., 2016[19]). In Kazakhstan, scholarship programmes seek to attract student teachers to rural areas (OECD/The World Bank, 2015[60]).

In Uruguay, the education authorities have been providing scholarships (*Uruguay Estudia* and *Becas Julio Castro*) to stimulate the retention of teacher candidates who are close to completing their studies. This may be a particular issue given that student teachers in Uruguay often see themselves required to work while studying to finance their education (Santiago et al., 2016[22]), something that was also identified as a challenge for teacher education in Colombia (Radinger et al., 2018[18]). More broadly, scholarship programmes may serve to raise the profile of initial teacher education and to attract highly skilled candidates into teacher education (see Box 3.2).

Given that attrition from the profession tends to be higher in the first years of the teaching career, it is essential to recognise the transition into teaching as a crucial part of the professional learning process and, accordingly, assign early career teachers a special learning status with corresponding support mechanisms (Paniagua and Sánchez-Martí, 2018[61]). Initial teacher education should incorporate special preparation for the teaching of particular students to support teacher graduates' smooth transition into employment in high-need areas (OECD, 2019[59]). Initial teacher preparation for particular student populations is discussed in depth in Chapter 4.

Policy may furthermore consider the current teacher population. In Belgium, authorities have mostly responded to teacher shortages and demographic developments with changes to the age of retirement and a phasing out of early retirements, which has also led to savings

for the federal budget between 2013 and 2016 (Ministère de la Fédération Wallonie-Bruxelles, 2016[62]; Flemish Ministry of Education and Training, 2015[63]).

Short-term strategies

For the short term, measures that are commonly discussed include increases in teaching load and class sizes, but their effect on the supply and retention of teachers is unclear (Santiago, 2002[64]). Also, retired teachers have been reactivated where no teachers could be found, as has been the case in Sweden and Estonia (Sveriges Kommuner och Landsting, 2018[36]; Santiago et al., 2016[40]).

Some countries have turned to recruiting teachers from abroad, which requires the recognition of professional qualifications and competences. Teachers may be recruited through dedicated agencies, or come independently to a country. Many large flows are between countries with linguistic and cultural connections. Teachers from other English-speaking countries, in particular the United Kingdom, are among the largest group in Australian schools, while Australians are well represented in the UK teaching population, for example. There are also specific programmes that place native-speaking language instructors in public schools in many European countries (UNESCO, 2018[65]).

Recruitment of international teachers can have benefits for individuals and schools, for instance through diversity in the profession. But it also carries risks. The loss for sending countries can be considerable, both in terms of their investment in the education of these professionals and for their school system as a whole (UNESCO, 2018[65]; Bense, 2016[66]).

The international dimension of teacher labour markets was also evident in some OECD reviews. In the Flemish Community of Belgium, larger cities with difficulties to recruit sufficient teachers have launched recruitment campaigns also in the Netherlands to fill teaching positions (Flemish Ministry of Education and Training, 2015[63]). Austria illustrates the other side of the coin, with the province of Vorarlberg reportedly competing for teachers with neighbouring Switzerland and the working conditions offered there (Nusche et al., 2016[41]).

Alternative entry routes provide additional flexibility to respond to increasing student numbers or to respond to a teacher shortage in specific subjects. Alternative entry has also been tried as a strategy to make teaching more attractive for those who would otherwise not be interested in teaching (see Chapter 4). Alternative entry may arguably broaden the range of backgrounds and experiences in schools and provide access to teaching for individuals at different stages of their lives and in different life circumstances (OECD, 2005[67]). At the same time, alternative entry raises questions as to whether teachers recruited via such pathways are as effective as conventional teachers – teaching is complex and intellectually demanding which requires expertise, discretion and judgement (Zeichner, 2014[68]) – and whether teachers who enter through an alternative pathway then remain in teaching (Little and Bartlett, 2010[2]).

Changes to entry requirements may also help address short-term shortages in leadership positions. In Chile, school principal positions have been opened for teachers with less experience to respond to difficulties in filling leadership positions, as long as candidates hold a certain level of education (Santiago et al., 2017[31]).

Box 3.2. Scholarships to attract high-quality candidates into teaching

Chile

The Teacher Vocation Scholarship (*Beca Vocación de Profesor*, BVP) provides academically talented secondary education graduates with a scholarship and other benefits if they choose teacher education as a higher education degree and teach in a publicly-funded school for at least three years. The extent of the benefit depends on the score obtained in the university selection test (*Prueba de Selección Universitaria*, PSU). In 2015, 9 413 scholarships were awarded. A further initiative is the Choose to Teach (*Elige Educar*) campaign. This is a partnership between the education ministry and a non-governmental organisation, which seeks to promote teaching through a variety of actions, including scholarships for individuals with experience outside education who would like to teach, and interventions to raise awareness of the importance of teaching as a profession.

Source: Santiago, P., A. Fiszbein, S. García, T. Radinger (2017), *OECD Reviews of School Resources: Chile 2017*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264285637-en.

Estonia

To address concerns that teacher education is not a very popular choice among upper secondary graduates, the government has started a range of programmes to raise the value of the teaching profession. A scholarship programme seeks to motivate students with talent for teaching to apply to teacher education specialisations and to acquire a teaching qualification. An allowance for beginning teaching is paid to students who enter the profession within 18 months of completing their education. Recently, the programme has been extended to professional support specialists. Also the Youth to School programme (*Noored Kooli*) seeks to raise interest in teaching and education by awarding scholarships to a select group of university students who teach at school for two years while taking part in teaching and leadership training. Upon completion of the programme, students can keep working at school, return to university or work elsewhere.

Source: Estonian Ministry of Education and Research (2015), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Estonia*, Estonian Ministry of Education and Research, Tartu, http://www.oecd.org/education/schoolresourcesreview.htm.

Lithuania

The Ministry of Education, Science and Sport as well as other actors in the school system have recognised that teaching is not currently perceived as an attractive profession and that high-performing graduates are reluctant to choose teaching as a career. On this basis, a range of promising initiatives have been put in place to make teaching more attractive.

In order to attract young talented people to initial teacher education, the government established a targeted teacher education scholarship in 2010 to support the acquisition of teaching qualifications for students having demonstrated good academic achievements. The government has also implemented a programme (I Choose to Teach!), to attract recent university graduates from different disciplines to work in schools. This programme was started with European Union (EU) funding and is now managed by the School Improvement Centre with business support. Programme participants receive tailored professional development to help them develop their teaching skills. Also, to attract high-performing students from a range of disciplines, the government provides funding for 400 student teacher places that are attributed based on the completion of a motivation test.

Source: Shewbridge, C., K. Godfrey, Z. Hermann, D. Nusche (2016), *OECD Reviews of School Resources: Lithuania 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264252547-en.

3.3. Management and use of resources for school staffing

As highlighted in Chapter 1, school systems employ a diverse range of staff in different roles. This includes:

- staff responsible for school leadership and instruction, notably school leaders and teachers but also teacher aides
- professional pedagogical, health and social support staff
- administrative, maintenance and operations staff (UNESCO-OECD-Eurostat, 2018, pp. 43-48[69]).

Which types of staff are employed depends on a number of factors, notably also the definition of roles and responsibilities of different staff, including those of teachers and school leaders. While teachers' roles are broad and complex everywhere, there are differences in the non-teaching activities that are defined in regulations. In some contexts, teachers may have a reduction of their teaching responsibilities to carry out specific roles which may be part of their career progression as discussed in Chapter 2. Several OECD review countries have, for example, diversified teachers' careers on a horizontal level to build school capacity and expertise in a specific area.

Also school leaders' roles and responsibilities differ, which will shape the other types of staff that are required in schools. In some countries, school leaders hold teaching responsibilities; in others, they dedicate themselves fully to school management to name just one difference across countries (also see Annex 1.A in Chapter 1).

The staffing of schools entails essentially tasks and responsibilities related to i) the management and use of resources to create positions for employment (that is contracting staff) and ii) recruitment to select specific candidates into these positions. The following sections analyse the management and use of resources for staff employment, while section 3.4 analyses staff recruitment.

3.3.1. Responsibilities for managing staff budgets and employment

The mix of staff that are employed for individual schools in terms of numbers and profiles will depend on the distribution of responsibilities for staff employment, that is for establishing the employment contract, covering the payroll and managing the related budget. Those acting as employers decide how to use available resources within their competence, and to plan staffing levels and mix based on their needs and levels of funding.

The employment of staff typically involves multiple actors. For example, schools may be responsible for employing their teaching and school leadership staff, while the local authority employs administrative staff and maintenance personnel, and the central authority provides and employs professionals for social support. Table 3.1 shows the distribution of responsibilities for the employment of different types of staff in public schools and the management of the related budgets for staffing in OECD review countries.

As the table illustrates, school leaders in lower secondary education are usually employed at higher levels than the school, but in a number of countries, other school leaders may be employed directly by schools (e.g. deputy principals in the Czech Republic). Teachers and teacher aides (where these types of staff exist) are most commonly employed at an intermediate level; in only six out of 19 review countries with available data are instructional staff employed by central or, in the case of federal systems, the state level. In another six systems, instructional staff are employed by schools.

In some OECD review countries, different authorities are responsible for the employment of professional support staff (e.g. schools in Denmark and Portugal rather than local and central education authorities respectively). As the experience of OECD review countries furthermore shows, responsibility for employment of particular staff can depend on the legal status of a school (e.g. the Slovak Republic) and be shared between authorities (e.g. for administrative, maintenance and operational staff in provincial schools in Austria).

In school systems where education authorities above the school level are responsible for staff employment, schools typically receive "in-kind" staff allocations. Austria and Uruguay illustrate this approach with direct staff allocations. In school systems where schools are themselves responsible for staff employment, schools typically receive monetary resources that they can then use to hire and employ their own staff. This is for instance the case in the Czech Republic, Iceland, Lithuania and Slovenia.

Table 3.1. Responsibility for school staff employment (ISCED 2), 2018

OECD review countries, public schools

Staff type	Central or state level	Regional/local/other intermediate level	School level
Leadership staff	Austria, Mexico, Portugal, Spain, Turkey, Uruguay	Belgium (Fl. and Fr.), Chile, Colombia, Czech Republic (principal), Denmark, Estonia (principal), Iceland, Kazakhstan, Lithuania (principal), Mexico, Slovak Republic (principal), Sweden	Czech Republic (deputy principal), Estonia (head of studies), Lithuania (other leaders), Slovak Republic (other leaders), Slovenia
Instructional staff	Austria, Mexico, Portugal, Spain, Turkey, Uruguay	Belgium (Fl. and Fr.), Chile, Colombia, Denmark, Iceland, Mexico, Sweden	Czech Republic, Estonia, Kazakhstan, Lithuania, Slovak Republic, Slovenia
Prof. support staff	Austria, Mexico, Spain, Turkey, Uruguay	Chile, Colombia, Iceland, Mexico, Sweden	Czech Republic, Denmark, Estonia, Iceland, Kazakhstan, Lithuania, Portugal, Slovak Republic, Slovenia
Administrative staff	Austria, Spain, Turkey, Uruguay	Austria (provincial schools), Belgium (Fl. and Fr.), Chile, Colombia, Mexico, Portugal, Sweden	Czech Republic, Denmark, Estonia, Iceland, Kazakhstan, Slovak Republic, Slovenia
Maintenance and operations staff	Austria, Spain, Turkey, Uruguay	Austria (provincial schools), Belgium (Fl. and Fr.), Chile, Colombia, Mexico, Portugal, Slovenia, Sweden, Turkey	Czech Republic, Denmark, Estonia, Iceland, Kazakhstan, Lithuania, Slovak Republic, Slovenia

Notes: The employer is the natural or legal person with whom the employee has an employment relationship. Instructional staff includes teachers and teacher aides. Professional support staff includes pedagogical, health and social support. For complete definitions of staff types, see the Glossary in Annex B; for detailed country profiles of school staffing, see Annex 1.B in Chapter 1; for full comparative tables, see Tables A.1. and A.2. in Annex A. For teacher aides and professional support staff, the table describes employment responsibilities for those staff which exist within countries' regulations. For professional support staff, the table primarily illustrates staff positions that can be created directly in schools rather than in dedicated resource centres that serve multiple schools. In Belgium (Flemish and French Communities), for example, professional support staff is provided by state authorities through centres for student guidance and psychological, medical and social services respectively, which are not included in this table.
Sources: Based on Country Review Reports, Country Background Reports (http://www.oecd.org/education/school-resources-review) and Descriptions of National Education Systems by Eurydice (https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en).

As the examples of Chile, Denmark and Sweden however illustrate, even if staff are formally employed at a level above the school, the employer may delegate responsibilities and provide some or all schools with financial resources to manage their own budgets. In

Denmark, for example, primary and lower secondary schools often receive funding from their municipality, which they can use to determine their staffing levels and mix. Schools have typically used their resources to hire a broad range of professionals: from social workers, psychologists and pedagogues to counsellors for behaviour, social inclusion and well-being (*Adfærd-Kontakt-Trivsel*, AKT) (Nusche et al., 2016[34]).

The reverse can also be true and the formal employer may be supported by a higher level in the administration of financial resources. In the Flemish Community of Belgium, for example, staff are employed by school providers which receive resources in the form of staffing hours, distribute these allocated hours between their schools and hire the required instructional and professional support staff (e.g. special needs co-ordinator, ICT co-ordinator, child care workers). Salaries of teaching and school leadership staff are, however, paid centrally through an educational services agency (*Agentschap voor Onderwijsdiensten*, AgODI) (Nusche et al., 2015[70]). This may reduce the administrative burden for school providers and facilitate monitoring and oversight over staff expenditures.

Staff may be recruited by the same entity which establishes the employment contract and makes decisions about the use and allocation of resources. Or a different authority may be responsible for hiring (see Table 3.2). The authority responsible for recruitment may also depend on the contract status awarded to teachers. In Colombia, Portugal and Turkey, for example, regional/local authorities or schools are responsible for recruiting temporary teaching staff, while permanent staff is hired at the central level. Staff recruitment is discussed in depth further below.

Table 3.2. Responsibility for employing and recruiting teachers (ISCED 2), 2018

OECD review countries, public schools

Responsibility for employment	Responsibility for recruitment: Central or state level	Responsibility for recruitment: Regional/local/other intermediate level	Responsibility for recruitment: School level
Central or state level	Austria, Mexico, Portugal (permanent teachers), Spain, Turkey (permanent teachers), Uruguay	Turkey (temporary teachers)	Portugal (temporary teachers)
Regional/local/other intermediate level	Colombia (permanent teachers), Mexico	Belgium (Fl. and Fr.), Chile, Colombia (temporary teachers), Denmark, Sweden	Iceland
School level			Czech Republic, Estonia, Kazakhstan, Lithuania, Slovak Republic, Slovenia

Notes: For full comparative tables on teacher employment, see Table A.1. in Annex A; for full comparative tables on teacher recruitment, see Table A.3. in Annex A.
Sources: Based on Country Review Reports, Country Background Reports (http://www.oecd.org/education/school-resources-review) and Descriptions of National Education Systems by Eurydice (https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en).

Which additional staff resources may be available to schools?

Besides the staff resources that schools receive for operating and providing education, be it in the form of monetary transfers or "in-kind" human resource allocations, schools (and

their staff, students and parents) may also be able to draw on staff provided through dedicated resource centres, or benefit from shared staffing allocations that work in multiple schools, and/or expertise provided from sources other than the education sector.

As Table 3.3 shows, a number of school systems provide specialised professional pedagogical, health or social support staff through such resource centres (see Box 3.3 for some more specific examples and Annex 1.B in Chapter 1 for country profiles). Such specialised staff can be provided in addition to or in lieu of staff working directly in schools. In the Czech Republic, Denmark, Estonia, Lithuania, Portugal, the Slovak Republic and Slovenia, resource centres are available in addition to specialist staff in school. Specialised staff resources may also be pooled at the discretion of education authorities. This is for example the case in Spain and Sweden, where local and state authorities respectively may allocate staff to work directly in schools or decide to organise centralised support services.

Of course, externally employed staff can still work closely with and in schools, for instance where staff from specialised resource centres work in different schools for some part of their working week. This may be the case for the psychological and paramedical staff working in Centres for Student Guidance (*Centrum voor Leerlingenbegeleiding,* CLB) in the Flemish Community of Belgium, for instance, which may have agreements with schools for staff to be present during school hours. Similarly, in the French Community, the staff of Centres for Psychological, Medical and Social Services (*Centre Psycho-Médico-Social*, CPMS) play an important role within schools, collaborating closely with teachers and school principals.

Moreover, schools may be able to draw on professionals providing advice on school development or coaching for teachers (which is discussed in Chapter 4). In Denmark, some municipalities, as well as the education ministry, provide learning consultants which schools can call upon for specialised advice (e.g. the use of data for improvement and change management) (Nusche et al., 2016[34]).

Similar professional bodies are in place in the Flemish Community of Belgium (Pedagogical Advisory Services of umbrella organisations of school boards), Lithuania (network of education consultants accredited by the national Education Development Centre) and Slovenia (pedagogical advisors provided through the National Education Institute) (Nusche et al., 2015[70]; Shewbridge et al., 2016[20]; Slovenian Ministry of Education, 2017[71]).

In Chile, schools (and school providers) can seek the advice of the education ministry's public technical-pedagogical consultants (*Asesoría Técnica Pedagógica*, ATP) on a range of issues, such as the planning of improvement strategies and the implementation of their school improvement plan. In addition, they are encouraged to contract (and pay for) private advisory services and their staff (*Agencia de Asistencia Técnica Educativa*, ATE), for example for advice on curriculum management, school leadership, coexistence and educational resources management (Santiago et al., 2017[31]).

Lastly, other government agencies or authorities may provide specialised professional staff, such as for student health and well-being or career guidance. In Iceland, health staff is provided by the ministry of health, for example. In Colombia, the country's Institute of Family Welfare (*Instituto Colombiano de Bienestar Familiar*, ICBF) provides programmes and strategies that target risk factors for students such as child labour, teenage pregnancy and recruitment into armed groups (Radinger et al., 2018[18]). Career guidance services in Austria, the Czech Republic, Estonia, Slovenia and Uruguay are also provided by authorities responsible for labour and/or social affairs (see Box 3.4).

Table 3.3. Professional support staff provided through resource centres (ISCED 2), 2018

OECD review countries, public schools

Country	Pedagogical support	Health and social support
Austria	x	Yes
Belgium (Fl.)	Yes	Yes
Belgium (Fr.)	Yes	Yes
Chile	x	x
Colombia	x	x
Czech Republic	Yes	Yes
Denmark	Yes	Yes
Estonia	Yes	Yes
Iceland	x	Yes
Kazakhstan	x	x
Lithuania	Yes	Yes
Mexico	Yes	Yes
Portugal	x	Yes
Slovak Republic	Yes	Yes
Slovenia	Yes	Yes
Spain	x	Yes
Sweden	x	Yes
Turkey	x	x
Uruguay	x	x

Notes: Resource centres refer to institutions operated by education authorities that provide centralised services and specialised staff, typically to ensure the effective delivery of related services to schools and communities. In Spain and Sweden, health and social support centres may be organised by state and local education authorities respectively at their own discretion. For detailed country profiles on staff employment, see Annex 1.B in Chapter 1; for full comparative tables on the provision of professional support staff see Table A.2. in Annex A.
x: not applicable
Sources: Based on Country Review Reports, Country Background Reports (http://www.oecd.org/education/school-resources-review) and Descriptions of National Education Systems by Eurydice (https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en).

Box 3.3. Professional health and social support provided through resource centres

In the **French Community of Belgium**, Psycho-Medical-Social Centres (*Centre psycho-médico-social,* CPMS), provide psychologists, social workers and nurses to address students' psychological, social guidance or health problems in schools at all levels of education. As part of their school development project (*projet d'établissement*), each school offering lower secondary education defines a Collective Action Plan (*Plan d'Actions Collectives*, PAC) that articulates collaboration between school staff and the team of the Psycho-Medical-Social Centre. The plan should identify and set related objectives; describe the actions to be implemented; identify the resources that can be mobilised for implementation; and define internal evaluation criteria. The Collective Action Plan should also be consistent with the General Project for Differentiated Education (*Projet général d'action d'Encadrement différencié*, PGAED).

Source: Ministère de la Fédération Wallonie-Bruxelles (2016), *Examen de l'OCDE des politiques pour un usage plus efficace des ressources scolaires RAPPORT PAYS Communauté française de Belgique*, http://www.oecd.org/education/school-resources-review/reports-for-participating-countries-country-background-reports.htm.

In **Denmark**, school hiring practices have traditionally resulted in a broad range of staff who work with students in the school. In addition, schools can draw on more specialist staff provided in the form of educational-psychological advisory services (*Pædagogisk Psykologisk Rådgivning*, PPR) run by local authorities for learning support and advice. In addition, schools, municipalities and citizens can seek advice in the area of special needs education and rare special needs free of charge from a central specialised knowledge and counselling organisation (*Videns- og Specialrådgivningsorganisation*, VISO) within the National Board of Social Services (*Socialstyrelsen*). VISO provides advice about methods to organise pedagogical frameworks and to create an inclusive learning environment and can also contribute to the diagnosis of a child's behaviour and special needs. Examples for the organisation's areas of expertise include autism, cerebral palsy and diffuse brain injuries, hearing loss, and self-harm. Typically, teachers and school leaders should in the first instance discuss their needs with their local educational-psychological advisory service (PPR), which should then decide if VISO should become involved.

Source: Nusche, D., T. Radinger, T. Falch, B. Shaw (2016), *OECD Reviews of School Resources: Denmark 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262430-en, pp. 154, 156.

In **Portugal**, an extensive network of special education resource centres (*Centro de Recursos para a Inclusão*, CRI) provide services and supplies to support the needs of students with special educational needs (SEN) in schools. In 2016/17, about 581 school clusters (72% of the public school network) received support from these resource centres which deploy a total of 2 251 technicians, such as occupational therapists, speech therapists, physiotherapists or psychologists. The resource centres are designed to support the inclusion of children with disabilities, build partnerships with local actors and facilitate the access of students with SEN to different activities.

Source: Liebowitz, D., P. González, E. Hooge, G. Lima et al. (2018), *OECD Reviews of School Resources: Portugal 2018*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264308411-en, pp. 143-144.

Moreover, civil society and the broader community within which the school is embedded may provide additional resources for schools and students. In Slovenia, for example, information on different occupations and vocational guidance is also provided by the country's Chamber of Commerce and Industry and the Chamber of Craft and Small Business, among others (Slovenian Ministry of Education, 2017[71]).

The centralised provision of specialised staff likely entails certain trade-offs and requires attention to ensure their staff can work effectively with schools. Specialised staff can provide expertise that may not be efficiently offered at a smaller scale (OECD, 2018[25]). At the same time, professionals may spend only a limited amount of time in individual schools, for example where they are shared across a number of schools. This might limit their ability to build working relationships with school staff and students and to connect their work to individual schools' development plans. This was for instance found in the provision of school psychological services in Austria (Nusche et al., 2016[41]).

Studying differences in the effectiveness of instructional coaches provided by the school district and those hired by schools, Kane and Rosenquist (2019[72]) found significant differences in coaches' time spent on instructional work with teachers. Where a broader range of actors is involved, co-ordination of funding and competencies are likely required (Maughan, 2018[73]). Again in Austria, for example, the federal court of audit identified a potential for synergies in the organisation and work of school medical services between the responsible ministries of education and health (Rechnungshof Österreich, 2018[74]).

Box 3.4. Professional support provided for schools and students through labour and social affairs authorities

In **Austria**, the Federal Ministry of Labour, Social Affairs and Consumer Protection (*Bundesministerium für Arbeit, Soziales und Konsumentenschutz*, BMASK) is the main actor and provider of funds for a system of career assistance (*Netzwerk Berufliche Assistenz*). Under this umbrella, the nation-wide Youth Coaching initiative provides advice and support for young people aged 15-19 at risk of dropping out from school or being marginalised. Youth coaches – who generally have a background in social work, therapeutic pedagogy, social pedagogy, social management or psychology – accompany these students and help them look for the educational pathway that works for them.

Source: Nusche, D., T. Radinger, M. R. Busemeyer, H. Theisens (2016), *OECD Reviews of School Resources: Austria 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264256729-en.

In **Uruguay**, the National Youth Institute (*Instituto Nacional de la Juventud*, INJU) organises career guidance workshops for young people aged 14-22 with a special focus on facilitating young people's choice between different programmes in secondary education. This includes the organisation of a career exhibition (*Expo Educa*) in the interior and in Montevideo, the country's capital.

Source: Santiago, P., B. Ávalos, T. Burns, A. Morduchowicz, T. Radinger (2016), *OECD Reviews of School Resources: Uruguay 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264265530-en.

3.3.2. Steering the use of resources for school staffing decisions

The role of regulations for staffing levels and mix

A number of countries set an overall framework that guides school staffing decisions (e.g. the Czech Republic, Iceland and Lithuania) (see Tables A.1 and A.2 in Annex A and Annex 1.B in Chapter 1 for staffing profiles of OECD review countries). In Chile, for example, all schools must comply with a number of technical-pedagogical, legal and infrastructure requirements to be officially recognised and provide school education. This also includes the requirement to "have available the suitable teaching/managing professionals, technical-pedagogical and classroom staff, by taking into account the educational level and modality, as well as the right number of education assistants to provide for the school's needs according to the levels, modality and number of students" (Centro de Estudios MINEDUC, 2016, p. 92[75]).

In Denmark, national regulations specify that all children have the right to teaching in accordance with their individual needs, while in Sweden, the Education Act stipulates students' right to access medical, psychosocial and special needs staff as well as career guidance. In the Slovak Republic, students have a right to an education that reflects their educational needs and possibilities in its content, forms and methods. Students should furthermore have access to free guidance.

Within such broad frameworks, more specific regulations may influence the creation of particular instructional, leadership and other staff positions. For teachers, the number of staff that are required depends on many factors, in particular the curriculum (defining the minimum requirements regarding subjects and instruction time) and school organisation (defining the type of professionals required, workload and class size). Other aspects, such as the ratio of teaching and non-teaching hours, the number and diversity of subjects in the curriculum, and the availability of other staff, also influence the number of teachers needed in a school (Bertoni et al., 2018[76]).

Class size regulations (which may vary across types of provision), educational levels or school size, also influence the number of teachers required in a school. Each student above the maximum permitted number of students in a class demands the forming of two classes (OECD, 2018[25]). In Denmark – where schools have a large degree of autonomy in their resource allocations – national regulations on class size and teaching hours in a school year and in different subjects establish the framework for the employment of teaching staff (Nusche et al., 2016[34]). Class size rules can, however, have undesired effects when enrolments change and classes have to be split unexpectedly, causing potential teacher shortages (OECD, 2018[25]).

For leadership positions, be it in the form of a full position or a reduction in teaching load, school size (e.g. number of students or teachers) typically plays an important role, and regulations may specify a threshold for the creation (and funding) of such positions. In Colombia, for example, school co-ordinators who are responsible for supporting school leadership and management, are appointed according to the enrolment of the school cluster.[1] A rural director position is created when an individual school site within the cluster (that offers only one or more of the levels of compulsory education but not all) has more than 150 students (Radinger et al., 2018[18]; Sánchez, 2018[77]). In Kazakhstan, regulations determine the specific types of leadership staff to be employed in schools, depending on the type and level of education and school size (see Box 3.5). Similarly, in Austria, Belgium (French Community), Iceland, Portugal, Slovenia, the Slovak Republic and Uruguay, the creation of different school leadership positions is regulated based on school size.

For some contexts, school size alone may, however, provide a limited measure for determining the required number of school leadership staff. In Colombia, where public schools are organised as clusters, the number of school leaders does not take the number of individual school sites and the distance between them into account. While this exerts pressures on the effective organisation of school networks and clusters, it also creates challenges for school leadership and management, particularly for small remote school sites which fulfil vital services to rural students and their communities (Radinger et al., 2018[18]).

The creation of positions for other types of staff typically tends to be at the discretion of individual education authorities and/or schools. Some systems, however, have more specific regulations for the creation of such positions in place (e.g. Kazakhstan, Portugal, Slovenia and Uruguay). To give one example, in Slovenia, school principals are responsible for organising and managing their staff, but must do so according to central norms and regulations for administrative, account-keeping and technical services and seek the approval of the education ministry. Counselling services and a librarian are required by law in all schools.

Some systems require the creation of specific staff positions (e.g. school climate co-ordinators and school librarians in Chile, and school nurses in Sweden), while decisions in other school systems require the approval of another authority (e.g. Lithuania) or must be taken within a local framework (e.g. Denmark). In 2013, Estonia gave schools and school owners greater autonomy in determining their staff mix. While a ministerial decree had previously established minimum staffing numbers for management and support services, this is no longer in place.

Box 3.5. School leadership teams in Kazakhstan

In Kazakhstan, the number and responsibilities of leadership positions allocated to each school depends on the school's size and level of education offered. At the primary level, for example, the main school leader is only formally recognised as a principal when the school has at least eight classes and 240 students. Schools with at least six classes are required to create half-time deputy positions for academic affairs and educational work, while those with more than ten classes employ them full time. Schools with more than 16 classes are required to employ an additional deputy for economic activities. In leadership teams comprising one school principal and three deputy principals, responsibilities are usually divided as follows:

- **School principal**: Leads the overall school in compliance with norms; approves the school plan, staffing and number of classes; appoints other school leaders and recruits teachers; fosters pedagogical improvement and professional development and distributes rewards to the staff; ensures learning materials, equipment and physical infrastructure are safe and up-to-date; ensures that disadvantaged students are supported and no children are out-of-school in the neighbourhood; reports to administrative authorities.
- **Deputy principal for academic affairs**: Co-ordinates and supervises pedagogical improvements and the dissemination of best teaching practices; plans school educational operations including class timetables; recruits teachers and supervises professional development; organises school evaluation, teacher appraisal and student assessments; ensures learning equipment is up-to-date.

- **Deputy principal for educational work**: Organises and ensures the quality of extracurricular activities and home-schooling for children with special needs; participates in the recruitment of, and supervises and supports the professional development of senior counsellors, after-school teachers, and home-school teachers; liaises with representatives of the community, law enforcement bodies, the parents' committee and individual parents.
- **Deputy principal for economic activities**: Administers, procures and controls expenditure on material and financial resources; supervises maintenance works; ensures compliance with fire and safety norms; monitors the operation of the school's technology and energy equipment.

Sources: OECD/The World Bank (2015), *OECD Reviews of School Resources: Kazakhstan 2015*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264245891-en; Republic of Kazakhstan Government Decree No. 77 (2008), as amended by No. 150 (March 31, 2017), http://adilet.zan.kz/rus/docs/V090005750 (accessed 20 March 2019).

The role of funding mechanisms for staffing levels and mix

Funding arrangements set essential parameters for the staffing of schools. The budget that is available to an employer (be it a school or an education authority) will determine the number of staff that can be contracted and the payroll that can be paid for. This budget can be made up of a number of sources and involve the transfer of funds (which can be tied to different conditions on their use) across levels of governance. In Sweden, for instance, municipalities are responsible for staff employment and manage resources for this purpose that come from central grants and local tax revenues (Ministry of Education and Research, 2016[78]).

Staff funding arrangements also influence the equity and efficiency of staff employment in a school system. For example, where employers are heavily dependent on local tax bases to pay for their staff, areas with more disadvantaged students are likely to have fewer resources to meet student needs, although fiscal equalisation mechanisms may offset such resource disparities to some extent (OECD, 2017[79]).

Where responsibilities for raising funds to pay for staff are misaligned, the employing authorities may have no incentive to ensure efficient staffing levels and to adjust them to changing needs, such as a fall in student enrolment (OECD, 2017[79]). At the same time, choices about the use of staff (e.g. in terms of class size, teacher-student ratios, use of teachers' time) have a bearing on educational expenditures and efficiencies as they influence the number of staff who are required.

The staff resources that are ultimately available to schools (and possibly the scope to influence resource use decisions for staffing) can impact the pedagogical autonomy of individual schools. During the OECD review of Austria, for example, various schools felt that increasing resource constraints, i.e. a lack of teachers or teaching hours, had made it difficult to use their pedagogical autonomy, e.g. for offering optional subjects (Nusche et al., 2016[41]). In Portugal, the review team had concerns that plans to give schools greater curricular autonomy and flexibility would likely require more resources to actually create pedagogical innovations (Liebowitz et al., 2018[51]). A minimum level of resources is then necessary to provide a high-quality education (OECD, 2017[79]), including sufficient funding for the adequate staffing of schools.

Changes to the organisation of school education, such as the length of the school day or the education of children with special needs, will be an important factor influencing the required staffing mix in schools as discussed in Annex 1.A in Chapter 1. They also require sufficient reflection about their resource implications and funding arrangements (e.g. through increases in teachers' working time, a shift of budgetary resources towards the employment of support staff, etc.).

The funding of school education is discussed in depth in OECD (2017[79]). The following sections discuss school funding as it relates to school staffing levels and mix.

Nature of funding allocation for school staff

The extent of decision making over the use of resources for the staffing of schools – be it at the school or another level – is influenced through the nature of that allocation. At the same time, the type of allocation determines the steering power and control over staffing decisions and salary costs for the authorities that provide the resources.

Monetary transfers without restrictions on their use give individual schools or authorities the greatest level of autonomy in terms of staff spending. At the same time, this creates a tension between flexibility and accountability. Monetary transfers that are earmarked for specific types of staff, on the other hand, give the allocating authority a degree of control over how much is spent on different types of staff (OECD, 2017[79]).

Funding can also be linked to a minimum level of expenditure on particular staff types. In Lithuania, for example, the education ministry specifies a minimum spending level for teachers, and also a recommended amount of per-student spending on vocational and career guidance and pedagogical and psychological services. Schools propose their staff positions which are then subject to approval by the school founder. To reflect these spending requirements, the calculation of the resource envelope includes a component for pedagogical and psychological services (Shewbridge et al., 2016[20]). The Slovak Republic provides another example, with schools and school founders being required to spend the personnel normative defined by the central ministry on teachers (Santiago et al., 2016[19]).

Funds can furthermore be earmarked for the benefit of specific student groups, such as special needs students. In Chile, disadvantaged schools can receive funding through the preferential school subsidy (*Subvención Escolar Preferencial*, SEP). Half of the subsidy can be spent on additional staff and to develop technical-pedagogical teams made up of teachers and learning support staff, but spending must focus on the school's most vulnerable students (Santiago et al., 2017[31]). In the Slovak Republic, funds for teaching assistants for disadvantaged students are earmarked for specific schools. Targeted funding can be a further way for shaping the staffing mix in schools (see Box 3.6).

Box 3.6. Targeted funding to provide specialised support staff for schools

In **Chile**, the education ministry provides funding to school providers to finance learning support staff through its School Integration Programme (*Programa de Integración Escolar*, PIE). Through this programme, schools can integrate up to five students with transitory disabilities and two students with permanent disabilities per classroom. Integrated students with special needs receive at least between six (half-day school) and eight (full-day school) hours of professional support per week within the classroom.

The resources provided through this programme can be used for a range of purposes, such as the purchase of educational materials and the adaptation of the physical space, but also for hiring learning support staff. Schools can establish multidisciplinary teams that include specialists such as speech therapists, special needs teachers and psychologists to provide support for teachers and students within classrooms. Learning support staff hired through the programme also need to dedicate at least three hours to collaborative work with the school's classroom teachers. In 2015, 45% of schools were participating in the programme.

In addition, the National Board of School Assistance and Scholarships (*Junta Nacional de Auxilio Escolar y Becas*, JUNAEB), an agency responsible for administering state resources to ensure that vulnerable children and adolescents can enter, stay and have success in the educational system, has established programmes to provide psychological and social support for vulnerable students at the risk of drop-out.

Through the Programme to Support School Retention (*Programa de apoyo a la retención escolar*) interdisciplinary teams made up of pedagogues, social workers and psychologists provide pedagogical and psychological support to groups of students or individually. The Skills for Life initiative (*Habilidades Para la Vida*) provides psychological and social support for the school community, including students, teachers and parents, in the two years of pre-primary education prior to entering primary education and the first two years of primary education. Teams and units of social work and psychological services within municipalities develop projects that are then presented to the regional offices of the JUNAEB. If selected and approved, teams and projects receive initial funding for three years with the option of being extended.

Source: Santiago, P., A. Fiszbein, S. García, T. Radinger (2017), *OECD Reviews of School Resources: Chile 2017*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264285637-en.

In **New Zealand**, the education ministry funds a dedicated learning and behaviour service and provides funding and resources for Resource Teachers: Learning and Behaviour (RTLB). These learning and behaviour specialists work across a number of schools and support them in managing the additional learning needs of students. There are nearly 1 000 such specialist teachers working in 40 clusters throughout the country at a cost of approximately NZD 90 million (New Zealand dollars) per year.

Funding is allocated based on student enrolment and socio-economic background and covers educational support, release time for classroom teachers to meet with the RTLB, and professional development for departments, syndicates and schools to enhance skills in behaviour management or curriculum development. In an evaluation of this type of support, the country's Education Review Office found that recent changes to the structure and governance had led to improvements in the support these specialist teachers provide.

Source: Education Review Office (2018), *Resource Teachers: Learning and Behaviour Governing and Managing RTLB Clusters*, Education Review Office, Wellington, https://www.ero.govt.nz/assets/Uploads/RTLB-Evaluation-Report2.pdf (accessed 5 December 2018).

Basis for determining funding allocation

The allocation of resources for the staffing of schools – through monetary resources or "in-kind" allocations to intermediate authorities or schools – can be determined on the basis of different mechanisms as discussed in OECD (2017[79]). Regardless of the specific mechanism, the resource allocation typically takes a number of aspects into account, which can set incentives for the efficient use of staff and mitigate inequities in available resources.

Student enrolments will be an important factor determining allocations in all school systems to ensure sufficient teaching staff for the required instruction time. The required teachers can be determined on the basis of student numbers or the number of classes (OECD, 2017[79]). Allocating teacher resources on a per-student basis promotes competition and efficiency in the organisation of schooling and the management of teachers, for example in terms of the size and number of classes which are much more important for determining the cost of teaching than total enrolment (OECD, 2017[79]).

A teacher working with a small class of students will present a higher cost per student. Assuming that two teachers have the same salary, the salary cost per student of a teacher teaching a class of five students, for example, will be six times higher than the salary cost per student for a class of 30 students (IIEP-UNESCO, 2016[80]). At the same time, fixed costs do not diminish with the number of students and teachers cannot be easily distributed between classes and schools. Per-student allocations of teacher resources can therefore create pressures for schools with small or declining enrolments which have high numbers of staff for few students (OECD, 2017[79]).

Where funding is allocated on a historical basis, this funds existing staff year after year and typically involves the payment of invoices submitted for supplementary costs. While this can fund the expansion of education (and the required staff), it also sets no incentives for education authorities or schools to increase their efficiency or to improve the quality of their provision (OECD, 2017[79]).

Teachers' salaries (over which the authority responsible for hiring and paying teachers may have no control) will be a further important factor that determines the resources required to employ a certain number of staff with a particular level of qualifications and experience. Some school systems that use a funding formula to determine allocations therefore transfer funding based on some kind of estimation of average cost. Such systems i) provide a specific framework for balancing actual teacher salary expenses with the amount of funding available to pay for staff and ii) can act in an equalising way as they promote similar staffing levels across schools.

In Estonia, for example, once the total number of teaching hours and full-time equivalent teaching positions has been determined for a municipality, this figure is multiplied by a national minimum salary for teachers and increased by 20% to determine a municipality's teacher salary budget (Santiago et al., 2016[40]). Similarly, in Lithuania, average teacher salaries have been an important input variable in the formula determining the allocation of resources (Shewbridge et al., 2016[20]).

In other countries, the level of teacher salaries is not taken into account. In the Flemish Community of Belgium, for example, schools receive a total number of teaching hours which are paid by the ministry regardless of actual staff cost to provide these hours. This has led to large differences in expenditure across levels of education since teachers in upper secondary education receive higher salaries based on levels of qualifications and since classes at this level tend to be smaller (Nusche et al., 2015[70]).

Beyond minimum staffing levels, schools may benefit from additional monetary or "in-kind" staff resources to account for their particular contexts, either as part of the main allocation or through additional allocations. Typically, a mix of allocations is found in many systems and additional staff allocations are a common approach to addressing disadvantage in Europe (OECD, 2017[79])

When looking at data from the PISA 2015, a number of countries allocate additional teaching staff to disadvantaged schools: in 49 out of 70 systems, disadvantaged schools (public and government-dependent private) have more teachers per student or smaller classes than advantaged schools (as reported by school principals). However, in none of these systems do principals of disadvantaged schools report that their teachers are more qualified, and in 19 of these systems science teachers are less likely to hold a major in science or full certification. The analysis of these data also suggests that compensating for disadvantage by allocating additional teaching staff is likely insufficient to close gaps in students' performance based on socio-economic status. The quality of teachers also needs to be considered (OECD, 2018[4]).

Indeed, additional funding that can be used to hire more or better qualified staff or additional staffing allocations that are paid for directly do not ensure first, that recruitment processes are in place that would hire more qualified staff and second, that a supply of qualified staff is available (Adamson and Darling-Hammond, 2012[81]). As explored in the sections on staff recruitment below, the type of teachers that work in a school is also linked to the recruitment and allocation processes and criteria, as well as teachers' preferences and incentives to work in particular schools.

3.3.3. Planning and managing schools' staffing levels and mix in line with available resources and emerging needs

Those who are responsible for managing budgets for staff employment will have to adequately plan and manage their staffing levels and mix according to their needs and development plans as well as levels of available funding in the medium term. Projected student enrolment and staff movements will be important factors to take into account. This will also include 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 (OECD, 2019[59]).

Where schools are responsible for managing their staffing budgets, such as England (United Kingdom) and Victoria (Australia), education authorities may provide schools with guidance and tools for this purpose (Department for Education, 2018[82]; Department of Education and Training Victoria, 2019[83]). They may also have in place specific monitoring processes to assess financial risk and ensure the stable functioning of schools, as is the case in Chile and the Netherlands (see Box 5.7 in OECD (2017[79]) for details).

Predictability and flexibility in funding allocations

Those responsible for the employment of staff require sufficient levels of stability in funding to plan staffing needs but also flexibility to respond to unforeseen needs, such as an increase in student enrolment, as the experience of the OECD review highlights.

In Colombia, for example, regular changes to the formula used to distribute resources for education as part of the country's fiscal transfer mechanism (*Sistema General de Participaciones*, SGP) have been found to reduce the predictability of available resources as well as the interest of regional and local Secretaries of Education in improving the

efficiency of provision within the framework of a multi-year work plan. They furthermore limit the system's objective of ensuring the financing of the teacher payroll, especially in those regional and local authorities with fewer resources (Radinger et al., 2018[18]). Similarly, in Estonia, funding of teachers' salaries has been subject to continuous and often contested adjustments in the past (Santiago et al., 2016[40]).

While the Czech Republic has recently changed its central funding allocation for direct education costs, including teacher salaries, beginning from January 2020, the principles and technical details for these amounts had been held constant from 2012 until then. This ensured stability and predictability of financing in the past, and allowed all schools to plan their development for a number of years (Shewbridge et al., 2016[42]). The transition to the new funding mechanism (a change from a per-student to a per-class normative) has been accompanied with the training of regional and local education authorities and schools.

At the same time, the previous regulations for allocating resources for direct costs in the Czech Republic allowed for local flexibility through negotiations in the application of the per-student normative amounts. Moreover, at the school level, an adjustable component of teacher salaries provided a sort of "cushion" to accommodate small fluctuations. In the country's previous approach to funding direct costs (notably for teacher salaries), these mechanisms recognised the risk that came from the allocation of funds to individual schools on a per-student basis. The system acknowledged that even a small decrease in the number of students may result in a corresponding decrease of funds for salaries, which may make funds insufficient for teacher salaries – which remain fixed (Shewbridge et al., 2016[42]).

Adjustments of staffing levels to changing student enrolment

A fall in student enrolment may require changes to staffing levels, possibly together with a reorganisation of the school network as discussed in OECD (2018[25]). This may also involve a reorganisation of school leadership, for example by creating school clusters with multiple sites, as has been the case in Denmark and Iceland (Nusche et al., 2016[34]; Icelandic Ministry of Education, 2014[84]). Where staffing levels cannot be adjusted to falling enrolment, the additional available teacher resources would be optimally allocated if targeted at those who are likely to benefit the most, i.e. disadvantaged groups and students in pre-primary and primary schools (OECD, 2017[79]).

In systems with central teacher allocations, the transfer of staff can help adjust staffing levels to changes in enrolment in different schools. In Spain, for example, the Personnel Commissions of the Autonomous Communities organise processes for the transfer of civil service teachers within their territory on an annual basis, and for transfers between communities every two years. Similarly, in Turkey, the central ministry and regional education authorities organise such teacher transfers (Eurydice, 2019[85]).

In systems with decentralised teacher employment, schools may be supported by central education authorities in adjusting their staffing levels:

- In Ireland, the Department of Education and Skills co-ordinates a redeployment process to facilitate the transfer of teachers on permanent contracts and contracts of an indefinite duration. To be allocated all of their teaching positions, schools have to comply with these redeployments (Department of Education and Skills, 2019[86]).
- In New Zealand, where school boards are responsible for teacher employment, the Ministry of Education may help cover the costs (teacher's salary and severance

pay) when disestablishing a permanent teaching positions (Ministry of Education, 2019[87]).

- In Slovenia, the education ministry supports the transfer of a teacher in case a position becomes redundant due to falling student enrolment. No open recruitment process is required in this case. If a new position can be found, the teacher remains in the same wage grade, otherwise the teacher is entitled to severance pay. If a teacher refuses to be reassigned where an agreement has been found between the ministry and the old and new schools, the contract is terminated without severance pay (Eurydice, 2019[85]).
- In Victoria (Australia), a Multi-School Staffing model enables two or more schools to temporarily transfer staff between the schools on an annual basis to better meet the needs of each school (Department of Education and Training Victoria, 2019[88]).

However, teacher labour markets may entail certain rigidities that work against teacher mobility, such as different qualification requirements (e.g. between general and vocational or mainstream and special needs education as discussed in Chapter 2) or limited portability of statutory rights. In the United States, teachers' qualifications may not always be recognised in a different state, for example, thus reducing mobility (Goldhaber et al., 2015[89]). In Austria, the statutory rights which teachers acquire through seniority, such as the progression in the salary scale and pension entitlements, may also not always be recognised as teachers change employment, reducing teachers' mobility and creating in effect localised teacher labour markets (Nusche et al., 2016[41]). In Colombia, certified regional and local education authorities can transfer staff, but this requires administrative agreements which have sometimes been difficult to establish (Radinger et al., 2018[18]).[2]

Of course, student enrolment may also increase and require additional staff resources. In the OECD reviews of Colombia, Portugal and Uruguay (for early childhood education), the public funding of private providers has created essential flexibility to respond to such rising demands (Liebowitz et al., 2018[51]; Radinger et al., 2018[18]; Santiago et al., 2016[22]). The review's reports on school funding and responsive school systems discuss the funding of private providers in depth (OECD, 2018[25]; OECD, 2017[79]).

Contract conditions and working time arrangements

Teacher salary costs and working time (e.g. full-time and part-time work) play an important role for schools or authorities to manage their available resources (Bertoni et al., 2018[76]) as do contract conditions (e.g. permanent and temporary employment).

Countries typically have different types of contracts for teachers, employing some on a permanent and others on a temporary basis (see Table A.3. in Annex A). Based on data available from the TALIS 2013, the share of teachers employed on fixed-term contracts however differs widely, from less than 80% in Chile, Israel, Finland, Mexico and Portugal to more than 95% in Denmark and France ((OECD, 2014, pp. 270, Table 2.8[90])).

The possibility to employ staff on different types of contract can potentially create dual labour markets as has been the case in some OECD review countries:

- In the Flemish Community of Belgium, where teachers are employed by school boards, all beginning teachers are recruited on a temporary basis of one year before they can be appointed to a temporary position of continuous duration and ultimately on a permanent basis (Nusche et al., 2015[70]). Similarly, in the French Community,

teachers can be employed in temporary, priority temporary or permanent employment positions (Ministère de la Fédération Wallonie-Bruxelles, 2016[62]).

- In Colombia, temporary teachers fill vacancies that cannot be filled through the central recruitment process. Candidates that were not successful in the central recruitment can become part of a register of qualified candidates and take on temporary positions which are filled directly by the regional and local authorities that provide education (Radinger et al., 2018[18]; Sánchez, 2018[77]).
- In Portugal, teachers with lower rankings in the central recruitment and allocation are also employed on temporary contracts (Liebowitz et al., 2018[51]).

Temporary contracts (which may be limited to a specific duration or a maximum number of renewals before a staff member has to be appointed on a permanent basis) create essential levels of flexibility in the management of staffing levels to respond to changing student demographics and to keep long-term financial commitments in check. Temporary appointments may also facilitate the evaluation of a teacher's skill and ability to grow before offering a permanent contract.

However, dual labour markets can also create adverse effects for schools, teachers and students. Given different contract conditions, temporary teachers often do not benefit from the same statutory rights as their colleagues on permanent contracts (e.g. when it comes to professional development opportunities or career and salary progression). Temporary teachers may need to move from one school to another and can be dismissed in a relatively straightforward manner, also possibly affecting their motivation to stay in the profession. In school systems where there is little mobility among permanent teachers, temporary teachers may in fact ensure the necessary flexibility in the teacher labour market.

For schools and students, temporary contracts can result in a lack of stability in teaching staff if temporary teachers are at the risk of being replaced by a teacher with a permanent appointment. Where temporary teachers are not seen as full members of the school community, this can affect school climate, morale and collaboration. There can also be inequities if teachers on permanent contracts are concentrated in certain schools. Teachers in the more challenging contexts may then be employed under less favourable conditions (Liebowitz et al., 2018[51]; Radinger et al., 2018[18]; Nusche et al., 2015[70]).

The management of working time is a further essential dimension to manage staffing levels and to ensure flexibility in staff supply as working time can be increased or reduced more easily to changing student numbers than staff positions. Depending on the working time arrangements in place as described in Chapter 2, education authorities or schools may adjust a teacher's working hours or teaching load. A number of OECD reviews illustrate the use of working time adjustments to respond to changing needs.

In Kazakhstan, for example, where teachers are employed on a teaching load basis, school principals decide how many weekly teaching hours to allocate to each teacher. As the OECD review found, school principals typically allocate fewer hours where not all teachers are required, thus avoiding staff dismissals (OECD/The World Bank, 2015, p. 35[60]). In the OECD reviews of Austria and Colombia, on the other hand, staff were often asked to work additional hours in the form of overtime where more staff were required than currently available (Nusche et al., 2016, p. 167[41]; Radinger et al., 2018, p. 258[18]). In the OECD review of the Flemish Community of Belgium, part-time work was found to provide flexibility to respond to fluctuations in demand for teachers (Nusche et al., 2015[70]).

As the TALIS 2018 documents, the use of part-time arrangements differs significantly across countries, both in terms of the overall share of teachers who work 90% or less and the share of full-time hours they work (see Figure 3.3). While more than 30% of lower secondary teachers reported to work part-time in Estonia, Kazakhstan and Lithuania, less than 10% reported doing so in Finland, Hungary, Japan, Korea and the United States. In Mexico and the Netherlands, more than half of teachers reported working part-time.

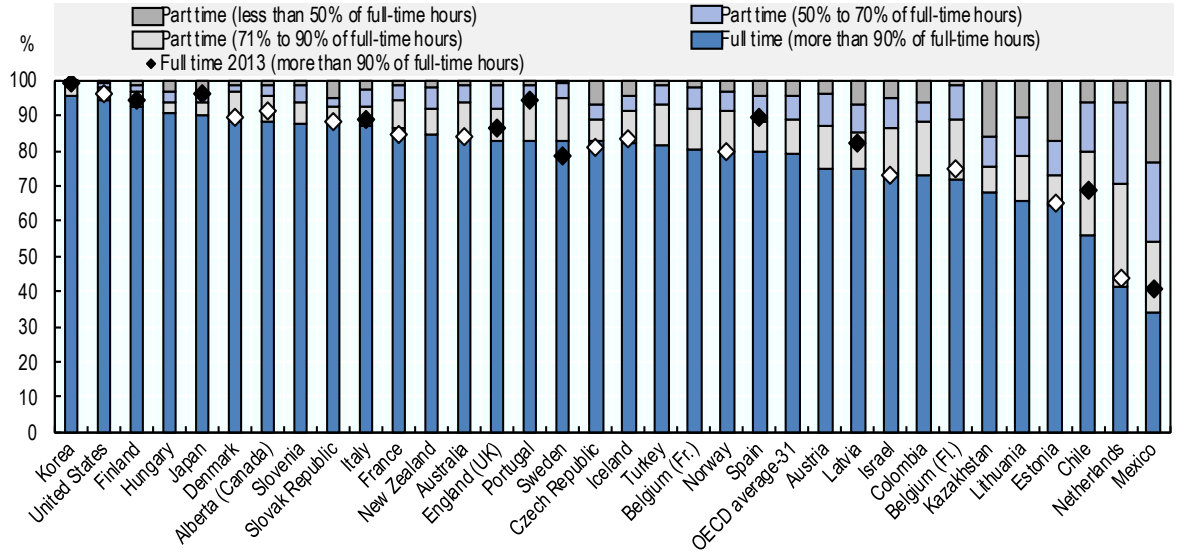
Part-time work has become more widespread: in ten out of 24 countries with available data, the share of teachers working part-time increased significantly between the TALIS 2013 and 2018. In Chile, Portugal and Spain, the increase was more than ten percentage points (authors' analysis of TALIS database).

As highlighted in Chapter 2, the management of working time always also needs to consider implications for staff well-being and satisfaction. Concerning reduced working hours, an important distinction has to be made between voluntary and involuntary part-time work. As the TALIS 2013 highlighted, in some countries, teachers' preferences resulted in a large share of teachers on part-time contracts (e.g. Australia, Denmark, France, the Netherlands and Norway); in others, it was the result of an absence of full-time opportunities (e.g. Mexico, Poland and Portugal) (OECD, 2014, p. 40[90]). Teachers who may like to work more hours may then seek additional employment, be it in multiple schools or outside of school education as discussed in Chapter 2.

In Uruguay, based on the latest national teacher census conducted by the educational administration in 2015, 12% of teachers reported to work in at least three schools, with the proportion amounting 17% in public secondary and 21% in private secondary schools (Instituto Nacional de Evaluación Educativa (INEEd), 2016[91]).

Figure 3.3. Employment status of teachers, full time or part time (ISCED 2), 2018

Percentage of teachers who are employed full time and part time (taking into account all their current teaching jobs, based on teacher reports)



Notes: Countries and economies are ranked in descending order of the percentage of teachers working part time. The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.

Sources: OECD (2019), TALIS 2018 Database, http://www.oecd.org/education/talis/talis-2018-data.htm (accessed 17 July 2019); OECD (2014), *TALIS 2013 Results: An International Perspective on Teaching and Learning*, OECD Publishing, Paris, https://doi.org/10.1787/9789264196261-en, Table 2.7.

StatLink https://doi.org/10.1787/888934026468

Matching staff resources and mix with school needs

Lastly, the staffing levels and mix in schools need to enable all staff to do their work effectively and to cope with new demands such as those resulting from social and demographic changes (e.g. rise in single parent families or childhood poverty). As reported by school principals and teachers for the TALIS 2018, the staff resources available may not always be perceived to be sufficient to provide quality instruction.

On average, one in three principals reported "a shortage of support personnel" as hindering the quality of instruction "quite a bit" or "a lot" (see Figure 3.4). As Figure 3.5 illustrates, this differs however significantly across countries, with more than half of principals reporting this resource shortage in Colombia, Italy and Portugal, but less than 10% in Iceland, Lithuania, the Netherlands, Norway, Slovenia and Sweden. "Time for instructional leadership" also features among the top three resource issues identified by principals, which may, among others, be related to the distributed leadership structures and administrative staff available to them (OECD, 2019, pp. 108, Table I.3.63[37]).

The TALIS 2018 also explored resource issues from the perspective of teachers, asking them to rate the importance of a number of priorities if the education budget were increased by 5%. Similarly to school principals, some issues that teachers identified may be related

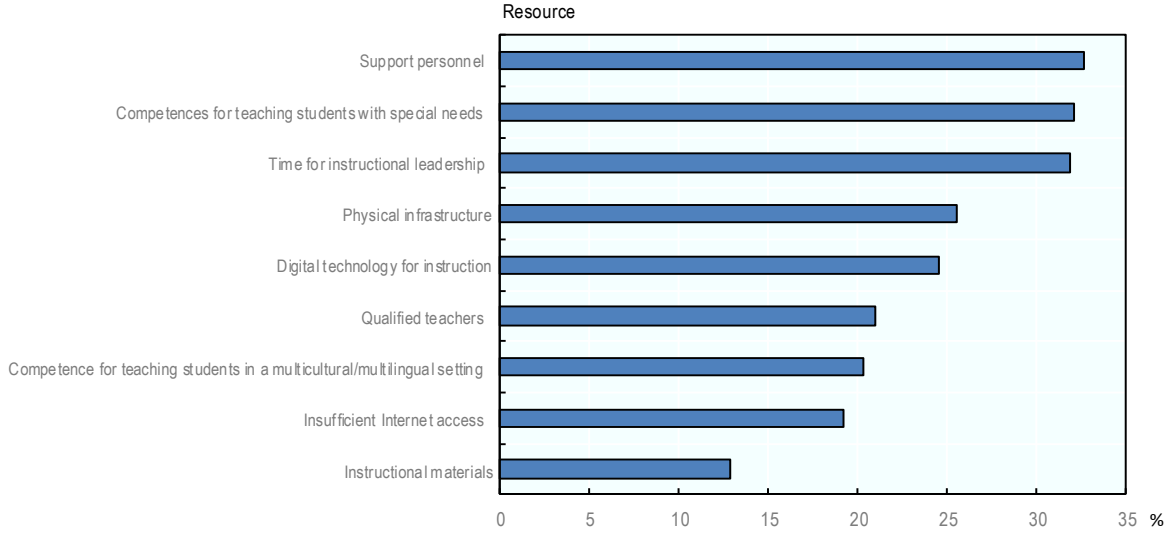
to staffing arrangements in schools. In 17 out of 48 participating countries, "reducing class sizes by recruiting more staff" was the number one spending priority, while "reducing teachers' administration load by recruiting more support staff" was as one of teachers' top three priorities in 24 countries and economies (OECD, 2019, pp. 110, Table I.3.63[37]).

In some school systems, such needs as identified by schools may point to actual shortages of specific types of staff; in others, the reasons may be more complex. In any case, changes to staffing levels and mix (and the related resource investments or reallocations) likely entail important trade-offs and should be based on a sound needs analysis. Some perceived shortages may for instance be more effectively addressed through investments in staff learning and development (e.g. for managing classroom discipline and student behaviour); others may require a more effective distribution and management of tasks and related time in schools or a shift of responsibilities to higher levels of the administration away from schools.

As analysed in Chapter 2 in relation to teachers' working conditions, for instance, the marginal impact and effectiveness of hiring more staff to support teachers in their administrative duties is contested, and, based on data from the TALIS 2018, there is no statistically significant association between the average proportion of teachers' working time devoted to general administrative tasks and the number of administrative and managerial staff per teacher employed in their schools.

Figure 3.4. Shortages of school resources (ISCED 2), 2018

Percentage of principals reporting that the following shortages of resources hinder the school's capacity to provide quality instruction "quite a bit" or "a lot" (OECD average-30)

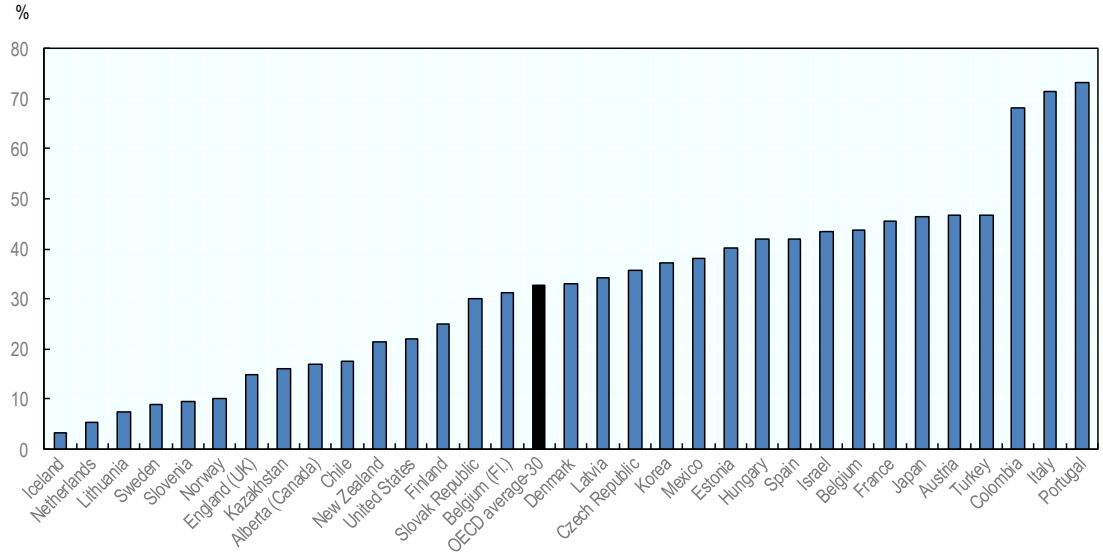


Notes: The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.
Source: OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en, Table I.3.63.

StatLink https://doi.org/10.1787/888934026487

Figure 3.5. Impact of support staff shortages (ISCED 2), 2018

Percentage of principals reporting that a shortage of support personnel hinders the school's capacity to provide quality instruction "quite a bit" or "a lot"



Notes: Countries and economies are ranked in ascending order of the percentage of principals reporting that a shortage of support personnel hinders the school's capacity to provide quality instruction "quite a bit" or "a lot". The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.
Source: OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en, Table I.3.63.

StatLink https://doi.org/10.1787/888934026506

3.4. Staff selection into particular schools and positions

While funding arrangements determine the resources available to employ different types of staff in schools, the recruitment of staff relates to the choice of a particular candidate to fill a specific role or position. The distribution of responsibilities for recruitment and the processes and criteria that are used for making hiring decisions also influence effectiveness and equity in the distribution of staff across schools.

There is a rich economic literature on the effects of the worker-employer match on productivity (Fredriksson, Hensvik and Skans, 2018[92]; Woodcock, 2015[93]; Jovanovic, 1979[94]). While there are only a few studies on the matching of staff to schools, and some studies suggest that teacher effectiveness is portable across schools (Xu, Özek and Corritore, 2012[95]), others suggest that the theoretical benefit of matching may be evident in education as well (Vegas and Ganimian, 2013[96]). Using a longitudinal data set of student test scores linked to teachers and schools in North Carolina (United States), Jackson (2013[97]) finds that certain matches between teachers and schools seem to be associated with better student outcomes. According to this study, the quality of a teacher's match with

a school explains two-thirds of their overall effectiveness, and effectiveness improves substantially when a teacher switches to a school that is a better match.

A good match between individuals and schools also seems essential for school leaders (Spillane, Halverson and Diamon, 2004[98]). In a recent study by Dhuey and Smith (2018[99]) on the effects of school principals on student achievement in maths and reading again in North Carolina (United States), the match between principals and schools accounted for a significant amount of principals' value added.

3.4.1. Teachers

Who is responsible for the selection of teachers?

The OECD Education at a Glance provides some comparative information on the responsibilities for hiring teachers and school principals for public lower secondary education (Tables D6.6a and D6.6b in OECD (2018[100]) available on line). Tables A.3. and A.4. in Annex A provide information for OECD review countries, which may differ from the data in Education at a Glance for some countries given differences in reporting from countries. The following provides an analysis of data available through Education at a Glance since it provides information for a larger set of countries.

Based on data from Education at a Glance, the selection of teachers is a school-level or decentralised responsibility in most countries. The responsibility for teacher recruitment lies with individual schools in 15 school systems (Austria, the Czech Republic, Denmark, England, Estonia, the Flemish Community of Belgium, Iceland, Ireland, Latvia, Lithuania, Netherlands, New Zealand, Scotland, the Slovak Republic, Slovenia, Sweden, and the United States). Ten countries indicated that this is the responsibility of an intermediate level: the regional/sub-regional level in six (Germany, Hungary, Israel, Italy, Japan, and Korea) and the local level in four countries (Canada, Chile, Norway and Switzerland). The highest level of governance, be it the central level or the state in the case of a federal system, is responsible for recruitment and allocation in seven countries (Australia, France, Greece, Luxembourg, Mexico, Spain and Turkey) (OECD, 2018[100]).

Overall responsibility for teacher recruitment however does not mean that hiring decisions are taken in isolation. Decisions on recruitment at the school level are taken in full autonomy in only six out of the 15 systems (the Czech Republic, England, Iceland, Lithuania, the Slovak Republic and Sweden). In the remaining nine, decisions are either taken within a higher-level framework or in consultation with higher-level authorities. Schools are thus not always completely autonomous in filling their teacher positions.

This was also evident in OECD review countries. In the Flemish Community of Belgium, for instance, schools recruit their teachers directly through their school board with considerable involvement of the principal, but they need to observe specific regulations set by the Community on qualification requirements (Nusche et al., 2015[70]).

Intermediate levels of governance may also need to respect central frameworks and regulations. In Mexico and Spain, for example, states and Autonomous Communities respectively are responsible for the recruitment and deployment of teachers. Recruitment and allocation processes however take place within a central framework or consultation with the central level (OECD, 2018[100]).

Similarly, recruitment decisions at higher administrative levels are not necessarily made by these authorities alone. Lower levels in the system, including schools, may provide input and inform allocation decisions. For OECD Education at a Glance, only Luxembourg, Portugal and Turkey reported that the central level is solely responsible for the recruitment and assignment of teachers to schools. In Australia, states make allocation decisions in consultation with schools. In France, the regional level informs assignment decisions by the central authorities (OECD, 2018[100]).

Again, the sharing of responsibilities across levels of administration was also evident in OECD review countries. In Austria and Uruguay, the school inspection services tended to provide some input into staff allocations by state and central authorities (Santiago et al., 2016[22]; Nusche et al., 2016[41]). In Chile, the recruitment of public school teachers has formally been the responsibility of the school provider, but the selection of teachers is carried out through a process that also involves the school. The school provider is then required to select the teacher ranked at the top of the list by the selection committee (Santiago et al., 2017[31]).[3]

Some countries have a mixed system, as is the case in Germany. In a number of states, teachers are assigned by public authorities above the school level and teachers apply to a recruitment process managed by these authorities. In addition, schools are allowed to advertise for positions at their own institutions for a certain share of the open positions in a given year, often related to particularly urgent needs or special profiles of the school. Applicants for teaching positions can choose to apply directly for an open position at a school or to submit an application to the general pool of applicants (Nusche et al., 2016[41]).

Which procedures and criteria are used for the selection of teachers?

Individuals who meet the required entry standards, such as qualification and registration requirements as discussed in Chapter 2 will need to pass through processes that determine where a teacher will work. The governance of teacher recruitment will influence the shape these processes take, the scope education authorities and schools have for designing their selection processes, and the rules they may have to follow in the process.

In systems with centralised teacher recruitment, teacher candidates are allocated to schools through a central process as they enter the profession and apply for transfers throughout their career should they wish to change to a different school. Some systems with decision making above the school level have mandatory transfer and mobility requirements in place, such as Japan and Korea (OECD, 2018[4]).

In Colombia, where school education is the responsibility of certified regional and local authorities, teachers both at the beginning and throughout their career apply through a central recruitment process for vacancies that the sub-national education authorities report to the ministry of education (Radinger et al., 2018[18]). Similarly, in Portugal, teacher candidates apply to a national recruitment that is open for both new and experienced teachers, disseminated in the official state journal and on the website of the education ministry (Liebowitz et al., 2018[51]).

The central recruitment processes will entail different elements depending on their design. In Portugal, teacher candidates are assessed based on factors such as the marks they received in higher education programmes and their years of teaching experience (Liebowitz et al., 2018[51]). In Colombia, candidates have to take a written knowledge and competency exam, a psychometric test, a check of credentials and an interview. The possibility of such

teacher tests to identify better teachers is most likely limited (Cruz-Aguayo, Ibarrarán and Schady, 2017[101]), but they can help ensure fairness and transparency (Estrada, 2019[102]).

In systems where teacher hiring is the responsibility of schools or intermediate authorities, candidates apply for a particular position at the school they wish to work for, either for their first position or to change jobs, while schools or intermediate authorities will be responsible for opening positions and defining the process to fill them. Recruitment processes will therefore differ. Schools and intermediate authorities may also collaborate in the recruitment process, for example through joint recruitment panels or through central support in advertising vacancies, screening applications and notifying applicants. Schools and authorities may have to comply with requirements linked to national employment regulations (e.g. in terms of publication of vacancies) or collective bargaining agreements (e.g. in terms of selection criteria) (more on this below).

3.4.2. School leaders

Who is responsible for the selection of school leaders?

Looking at school principal positions, recruitment is typically the responsibility of the education administration rather than individual schools. Based on data from the OECD Education at a Glance, only in eight systems with available data are schools directly responsible for the recruitment of their school principal (the Flemish Community of Belgium, England, Ireland, the Netherlands, New Zealand, Portugal, the Slovak Republic, and Slovenia). Most often, the recruitment of school principals is in the hands of an intermediate authority, such as the local, regional or sub-regional level. In seven systems, the central or, in the case of federal systems, the state administration is responsible for the selection and appointment of principals (Australia, Austria, France, Hungary, Israel, Luxembourg and Mexico) (OECD, 2018[100]). Table A.4. in Annex A provides again information based on the qualitative data collected for this report.

Information for other formal school leadership positions which may exist in a system, such as deputy principals or department heads, is not available from OECD Education at a Glance. The OECD review, however, provides some information about the type of formal middle leadership roles that exist in schools (see Table 3.4). This will also depend on the design of teacher and leader career structures which are analysed in Chapter 2.

In most OECD review countries, specific middle leadership positions are established by law. In some countries, education authorities or schools can decide the structure of their leadership team (e.g. Denmark and Spain). In Spain, for example, school principals present their ideas for their leadership team as part of their project proposal for the school when applying for their own position. In most countries, intermediary leaders are appointed by schools and their principals, which should give them the possibility to shape their leadership team according to their needs. In only six systems are intermediary leaders appointed by an education authority. As Table 3.4 also documents, the level of decision making can differ by role and between sectors or levels of a school system.

Table 3.4 Responsibility for appointment of intermediate school leaders (ISCED 1-3), 2018

OECD review countries, public schools

Country	School level and type	Leadership function	Appointment responsibility
Austria	Schools organised as cluster (ISCED 1-3)	Area manager	Cluster leader
	Schools not organised as cluster (ISCED 1-3)	Deputy principal, Administrator (federal schools only), Department head, Subject head	Board of Education
		Construction yard/workshop manager (in VET schools and colleges only)	School principal
Belgium (Fl.)	ISCED 1-3	Technical advisor-co-ordinator, Deputy principal, Technical advisor	School provider
		Managing director of a school group	Board of directors of the group, ratified by the group's general meeting
		Co-ordinating director	Association of schools
Belgium (Fr.)	ISCED 1-3	Deputy principal; Economic advisor; Workshop leader (ISCED 3 vocational only)	School provider
Chile	ISCED 1-3	Deputy principal, Head of technical-pedagogical unit, General inspector	School principal
Colombia	ISCED 1-3	Co-ordinator and Rural director	Central authority
Czech Republic	ISCED 1-3	Deputy principal	School principal
Denmark	ISCED 1-3	Leadership team as defined by local education authority (ISCED 1-2) or school board (ISCED 3)	School principal
Estonia	ISCED 1-3	Head of studies	School principal
Iceland	ISCED 1-2	Assistant principal, Department head	School principal
	ISCED 3	Assistant principal, Finance and Administration manager	School principal
Kazakhstan	ISCED 1-3	Deputy principal	School principal
Lithuania (1)	ISCED 1-3	Deputy principal	School
Portugal	ISCED 1-3	Deputy, Assistant principal	School cluster principal
Slovak Republic (2)	ISCED 1-3	Deputy principal	School principal
Slovenia (3)	ISCED 1-3	Assistant principal, Head of unit or branch	School principal
Spain (4)	ISCED 1-3	Head of studies and any other member of leadership team	School principal
Sweden	ISCED 1-3	Deputy principal, Department head	School principal
Turkey	ISCED 1-3	Chief deputy principal, Deputy principal	Regional education authority
	Social Science, Science and Project High Schools (ISCED 3)	Chief deputy principal, Deputy principal	Central education authority
Uruguay	ISCED 1-3	Deputy principal	Central education authorities

Notes: For full comparative tables on the recruitment of school leaders, see Table A.4. in Annex A.
1. Lithuania: The selection is based on a competitive process.
2. Slovak Republic: The selection of deputy principals is based on central regulations.
3. Slovenia: The selection of assistant principals is based on a public call for applications according to the procedure specified by an Act. The head of unit or branch needs to be selected from among the staff of the unit or branch.
4. Spain: The members of the leadership team are selected in consultation with the teacher assembly and school council, and subject to approval by the state education authority.
Sources: Based on Country Background Reports and Country Review Reports (http://www.oecd.org/education/school-resources-review/schoolresourcesreview-reportsforparticipatingcountries.htm).

Which procedures and criteria are used for the selection of school leaders?

Multiple OECD review countries reported difficulties in attracting qualified candidates for principalship. In some cases, recruitment issues are rooted in unattractive employment conditions, a high workload, insufficient professional support or incommensurate salaries. These issues are reviewed in depth in Chapter 2. In other cases, however, these concerns can be traced back to shortcomings in the selection procedures or a failure to effectively employ them in the recruitment process.

As for teachers, individuals who meet the required entry standards in terms of qualifications, teaching experience and leadership training (see Chapters 2 and 4), will need to pass through a process that determines the selection of particular candidates (see Table A.4. in Annex A for comparative tables on school leader recruitment on line).

Although an increasing number of countries have been developing professional standards for school leadership, the OECD reviews show that the use of detailed competency frameworks is often less advanced for leaders than it is for teachers. In some cases, school leader positions may have standardised job profiles but lack the detailed competency-based standards that could provide a clear and transparent reference for recruitment.

Some countries have introduced aptitude tests and assessment centres to inform the selection of school principals. In other countries, school leader selection is not regulated. In the Flemish Community of Belgium, for example, school boards organise the recruitment of school leaders autonomously. National standards or common required competencies for school leaders do not exist, although the Community education network has developed a set of competencies that are required for its school leaders. The extent to which school leaders are managed systematically or strategically is very much at the discretion of school boards (Nusche et al., 2015[70]).[4]

Some systems allow for the involvement of the school community in the definition of the selection criteria. In Victoria (Australia) for example, school councils or committees add a community criterion to a list of five central selection criteria, and in Chile, school boards define a competency profile that then serves as a reference for a central recruitment process through national authorities (Shewbridge et al., 2016, p. 186[42]).

More generally, given the role of school principals, their recruitment process often involves input from the school community, such as teachers, parents and sometimes students, which may help ensure a good match between school leaders and the community they will work with. In addition, other authorities, such as a public service authority, the school inspection or external experts, may provide expertise for the selection process and contribute to fairness and transparency of the process (see Table 3.5).

Concerning intermediary leadership positions, individual schools and their principals often have the say over selection into these roles as described above. In few cases, however, they also have to comply with central regulations. In Chile, for instance, principals can select their school leadership team from the municipality's teaching body, but the choice of middle leaders is restricted to those who fulfil central requirements (Santiago et al., 2017[31]). Similarly, in Lithuania, the Slovak Republic and Slovenia, schools have to follow specific selection procedures as defined in central regulations, while appointments in Spain require the approval of state education authorities (see Table 3.4).

Table 3.5. Involvement in school principal recruitment process (ISCED 1-3), 2018

OECD review countries, public schools

Country	Other education authority	School inspection	School community	Other public authority	External expert	Social partners
Austria	✓	✓	✓	x	✓	✓
Belgium (Fl.)	d	d	d	d	d	d
Belgium (Fr.)	d	d	d	d	d	d
Chile	x	x	✓	✓	x	x
Colombia	✓	x	x	x	x	x
Czech Republic	✓	✓	✓	x	✓	x
Denmark (ISCED 1-2)	x	x	✓	x	x	x
Denmark (ISCED 3)	d	d	d	d	d	d
Estonia	d	d	d	d	d	d
Iceland	x	x	✓	x	x	x
Kazakhstan	x	x	✓	x	x	x
Lithuania	✓	x	✓	x	x	✓
Mexico	✓	x	x	x	x	x
Portugal	✓	x	x	x	x	x
Slovak Republic	x	✓	✓	x	x	x
Slovenia	✓	x	✓	x	x	x
Spain	x	x	✓	x	x	x
Sweden	d	d	d	d	d	d
Turkey	x	x	x	x	x	x
Uruguay	x	x	x	x	x	x

Notes: This table describes stakeholders involved in the recruitment process of school principals (e.g. in an advisory role, on the selection panel, for approval of the chosen candidate, etc.) other than those responsible for the recruitment itself.
Education authorities refer to those other than a recruiting authority (e.g. a central ministry where school principals are recruited at a local level). The school community includes school boards, teacher assemblies, representatives of parents, students, employers, etc. Other public authorities refer to central public service institutions, etc.
For full comparative tables on the recruitment of school leaders, see Table A.4. in Annex A.
x: not applicable
d: at discretion of recruiting authority
Sources: Based on Country Background Reports and Country Review Reports (http://www.oecd.org/education/school-resources-review/schoolresourcesreview-reportsforparticipatingcountries.htm).

3.4.3. Matching staff with schools and students

Identifying effective teachers at the point of hiring and matching teachers with schools' and students' needs

One difficulty for any teacher recruitment process, whether centralised or decentralised, concerns the challenge to identify effective teachers at the point of hiring (Staiger and Rockoff, 2010[103]). Most externally observable indicators, such as teacher certification, advanced tertiary degrees and competitiveness of post-secondary programmes, are poorly correlated with improvements in students' achievement (Rockoff et al., 2011[104]; Boyd et al., 2008[7]; Kane, Rockoff and Staiger, 2008[105]). Such readily observable factors will thus likely not be sufficient to identify effective teachers.

Furthermore, recent evidence indicates that teachers who are effective in improving students' cognitive skills may not be necessarily equally effective in supporting students in developing their non-cognitive skills, such as resilience, growth mindset, self-efficacy and behaviour in class (Gershenson, 2016[106]). Affective and motivational competences therefore also need to be taken into account in selecting candidates (OECD, 2019[59]).

As OECD (2005[67]) argued, giving schools the authority for selecting their teachers may facilitate the ideal matching of teachers with particular talents and preferences to the needs of schools (e.g. student population, educational project, professional culture, teaching methods, extracurricular activities, etc.). A mixed-method study of a mid-sized school district in Florida (United States), for instance, found that some school principals used their influence on recruitment decisions to hire teachers that would enrich the mix of their staff in terms of race, gender, experience and skills and that they believed to be a good fit in terms of work habits (Harris et al., 2010[107]).

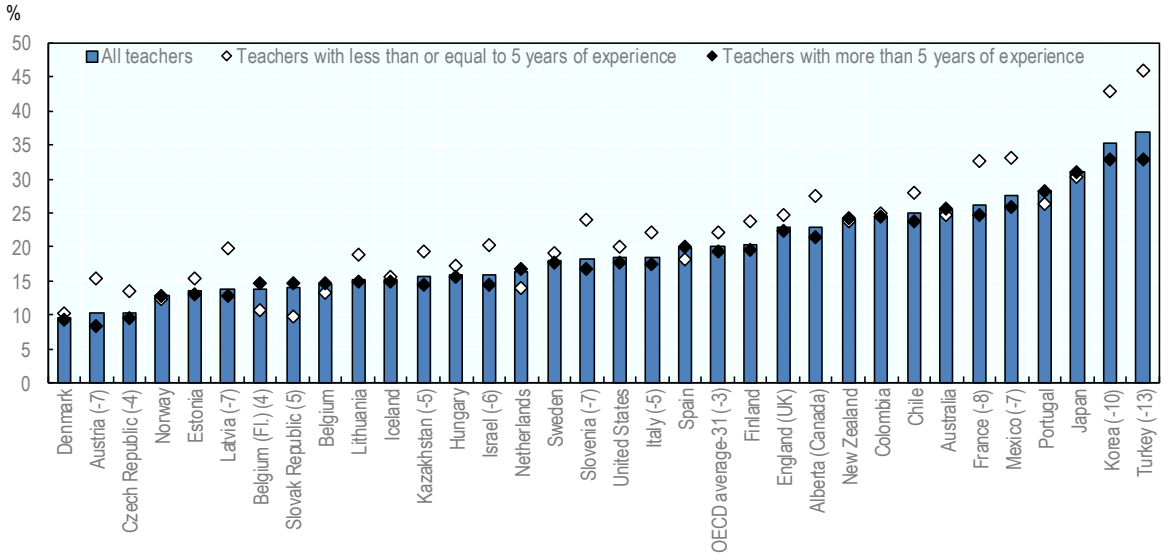
The experience of OECD review countries also illustrates the potential of school involvement in staffing decisions. School communities interviewed for the review of Lithuania placed great value on local decision making, including for staffing, and the possibility this creates for ensuring connections between the school and its community (Shewbridge et al., 2016[20]). In other reviews, a lack of school-level involvement in staffing decisions had led to workarounds with individual schools influencing allocation decisions through their personal connections, which is problematic since it obfuscates decision making for staffing (Nusche et al., 2016[41]).

As OECD (2005[67]) further argued, school-level hiring of teachers offers the advantage that applicants themselves can choose their workplace, have personal contact before the decision is taken and build a sense of commitment to their school. Locally determined matching has benefits in terms of job satisfaction (Daly et al., 2008[108]), length of commute and absenteeism. School-based teacher selection may therefore help to reduce teacher turnover and attrition if it leads indeed to better job matching and higher staff satisfaction (Vegas and Ganimian, 2013[96]; DeArmond, Gross and Goldhaber, 2010[109]).

The TALIS 2018 asked lower secondary teachers about their satisfaction with their work environment (OECD, 2019[37]). On average across OECD countries, one in five teachers would like to change to another school if that were possible, but this differs quite widely across countries, from 10% in Austria, Denmark and the Czech Republic, to more than 30% in Japan, Korea and Turkey (see Figure 3.6). Novice teachers were more likely to report wanting to change schools in 11 countries, which is possibly also related to the fact that new employees are looking for the right match with their workplace.

Figure 3.6. Teachers' job satisfaction with their work environment, by teaching experience (ISCED 2), 2018

Percentage of teachers who reported that they "agree" or "strongly agree" that they would like to change to another school if that were possible



Notes: Countries and economies are ranked in ascending order of the percentage of all teachers reporting to want to change schools if they could. Significant differences between novice and experienced teachers are indicated next to the country name (percentage point difference). The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.
Source: OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en, Table I.4.33.

StatLink https://doi.org/10.1787/888934026525

The empirical evidence on the effects of schools' autonomy to select their own teachers on student learning outcomes nevertheless is relatively scarce. A study of differences in school autonomy over teacher hiring between public and private schools in Korea under random assignment of students to both public and private schools finds that recruitment autonomy does lead to differences in the characteristics of teachers working in public and private schools. Private schools were found to have a higher share of male teachers and teachers on fixed-term contracts. Autonomy over teacher recruitment however did not affect achievement differences between public and private schools (Kim, 2017[110]).

Studies of school autonomy more broadly suggest that it can have beneficial effects on the average performance of students as measured by international assessments, but that this depends on the particular domain and policy context. Analysing data from the Third International Mathematics and Science Study (TIMMS), Wössmann (2003[111]) found that beneficial effects can be observed in particular when school autonomy in personnel and process (management) decisions is combined with centralised examination and accountability mechanisms. Based on a large-scale analysis of PISA data, Hanushek et al. (2013[112]) add the important caveat that school autonomy, in particular for academic content, but also personnel decisions, only has beneficial effects in relatively wealthy

countries, whereas the effects turn out to be negative in lower income countries with less developed institutions.

School-based teacher recruitment and selection alone is thus unlikely to result in a more effective distribution of teachers. The quality of the recruitment processes and the tools used for screening and selecting applicants generally will depend on the capacity of recruiters (e.g. in terms of preparation, experience and time). And recruitment outcomes will also depend on other factors, such as school-level resources and working conditions as well as teacher incentives and preferences (DeArmond, Gross and Goldhaber, 2010[109]). Where schools are responsible for staff recruitment, they need to establish policies to attract and retain qualified staff and ensure that their skills are matched with students' needs.

Schools may however not have the expertise to select the best candidate or time to manage applications, conduct interviews, assess candidates, extend job offers and process new hires. Recruitment needs may be difficult to predict given short-term changes in student enrolment or budgeting processes and only be known shortly ahead of the new school year at a time when it is difficult to organise activities such as classroom demonstrations. As Liu and Johnson (2006[113]) found for four states in the United States, teacher recruitment may be based in schools, but schools may not have the time to engage in processes such as setting up an interview panel or a classroom demonstration that would facilitate meaningful interactions between teachers and schools. The school-based recruitment process may therefore fail to provide rich information on the quality of a match (DeArmond, Gross and Goldhaber, 2010[109]). Without sufficient administrative capacity and resources, school-based teacher recruitment may furthermore create additional pressures for school leaders and demands on their time.

The extent of school autonomy may also be restricted by the supply of teachers willing to work in a school (Engel, Cannata and Curran, 2018[114]). A study of school-based hiring in Norway found that the delegation of recruitment responsibilities from municipalities to schools was linked with greater efficiency, but that this effect was stronger for schools with an excess supply of teachers (Naper, 2010[115]). Schools may moreover be bound by rules and regulations or collective bargaining agreements which may limit their flexibility in staffing decisions (OECD, 2018[4]). Schools may have to give preference to certain candidates, for instance to teachers with greater seniority or voluntary transfers before considering outside candidates (Engel, Cannata and Curran, 2018[114]).

While schools may have the say over their recruitment decisions, they may have less influence over other aspects of teacher employment which also influence the matching of teachers with schools, such as wage setting. In only four of the 15 systems which reported that teacher recruitment is the responsibility of individual schools, schools fix teachers' salary levels (the Czech Republic, England [United Kingdom], Estonia, and Latvia). In all of these four systems, schools need to respect central frameworks, such as nationally set minimum wages or collective bargaining agreements, when making salary-related decisions (OECD, 2018[100]).

In addition, limited budgets may restrict school's wage setting autonomy in practice as was found in the reviews of the Czech Republic and Estonia or render salary decisions ambiguous (Santiago et al., 2016[40]; Shewbridge et al., 2016[42]). Among systems where an intermediate authority is responsible for teacher recruitment, only in Japan are they also responsible for fixing salary levels (OECD, 2018[100]).

Particular potential seems to lie in schools and the education administration working together to build effective teacher recruitment systems. Administrators could ensure a good

match between the person and the job, while the school ensures a match between the person and the organisation and its people (Rutledge et al., 2008[116]). Recent work on teacher hiring in Washington DC (United States) suggests that the local level can play a role in identifying effective teachers. The district performed an in-depth pre-screening test to compile a shortlist of teacher candidates for principals to choose from. The test consisted of a subject-specific written assignment to assess candidates' understanding of content and instructional practices; a 30-minute structured interview with district staff; and a teaching "audition" that district staff observed and evaluated (Jacob et al., 2018[117]).

Contrary to previous findings from New York City public schools (United States), the authors find that both the in-depth screening test results and the more traditional academic background variables (like the Grade Point Average) are strong predictors of teachers' future performance evaluations. However, they are weak predictors of principals' hiring decisions. So while the authors are optimistic that background data and district-level screening tests can provide useful input for decentralised hiring decisions, they conclude that principals need to be supported and encouraged to draw on this information more heavily in the application process (Jacob et al., 2018[117]).

Safeguarding transparency and fairness in recruitment

The design of recruitment processes influences issues of fairness and transparency in selection – aspects that play an important role for candidates' decision to apply, the quality of the hired candidates and the level of staff performance and service delivery (Finan, Olken and Pande, 2015[118]). As in other fields, social networks can play an important role in recruitment. While social networks can facilitate the matching of job seekers to jobs, they can restrict access to jobs for those outside a network. More research about the role of social networks for teacher labour markets is needed, but research from the United States shows that teachers believe social networks to be important when looking for a position (Cannata, 2011[119]). Research also suggests that local ties are an important factor in explaining recruitment decisions (Boyd et al., 2013[120]). In extreme cases, recruiters may not have the incentive to hire the best candidate (e.g. principals may favour someone they know personally) (DeArmond, Gross and Goldhaber, 2010[109]).

Hiring practices may furthermore be at risk of discriminating against certain types of applicants and reduce diversity in the profession. In a study of a large suburban school district in the United States that had implemented policies to increase the supply of black teachers, black candidates' chances of being hired were low. White principals hired disproportionately fewer black teachers than their black peers (D'Amico et al., 2017[121]). This is a concern in terms of fairness in the recruitment process but also for students and schools. Growing evidence supports the value of students from minority backgrounds experiencing teachers in the classrooms who are from similar backgrounds (Gershenson, Holt and Papageorge, 2016[122]). Moreover, given the role of schools as social institutions, diversity is arguably important in its own right (D'Amico et al., 2017[121]).

Transparency and fairness were also concerns in a limited number of OECD reviews. To give an example, in the Flemish Community of Belgium, schools and school boards are not required to advertise their vacancies more widely, even if some of them do so in practice. They may keep lists of potential candidates and offer them employment directly without organising an open recruitment process (Nusche et al., 2015[70]). Similarly, in the Czech Republic, there is no requirement to publish vacancies for teacher positions. In the Slovak Republic, concerns about the transparency of teacher recruitment and the matching of supply and demand resulted in a requirement for school founders and schools

to publicise their vacancies on their websites. In addition, regional and national information has also been made available to disseminate vacancies more widely (Santiago et al., 2016[19]).

The quality of school leadership can also be compromised by a lack of transparency and fairness in selection processes which, as in the case for teachers, can make school leadership less attractive and deter high-quality candidates from applying. There are arguments for the employer of principals to take responsibility for their selection and management. The power to select who leads their schools gives school providers the possibility to match their human resource policy with their educational strategy, but it can put appointments at risk of favouritism at the same time.

In Austria, for example, the selection process of school principals was traditionally considered to be driven by political networks rather than by an objective assessment of the candidates' skills and competencies. The risk for "political" appointments was related to the political nature of the federal and state bodies responsible for the selection process, although these authorities have been reformed as part of a broader education reform (Nusche et al., 2016[41]).

In the Czech Republic, central regulations for school founders' appointments of their school principals which are organised on the basis of an open competition provide a sound basis for the recruitment of qualified candidates. The OECD review, nevertheless, found that a risk for "political" appointments by school founders remained since school founders are free to appoint the candidate of their choice (Shewbridge et al., 2016[42]). As for the case of teachers, hiring authorities, such as smaller municipalities, may furthermore lack the capacity to conduct high-quality recruitment processes.

Filling teaching positions in time

It can be difficult to fill teaching positions in time for the beginning of the school year, resulting in lost learning time for students which has been shown to negatively affect learning outcomes (Papay and Kraft, 2016[123]). Difficulties to predict staffing arrangements can hamper the recruitment process and result in filling vacancies after the beginning of the school year. In centralised systems, assignment processes can be slow to fill positions if too few teachers were initially assigned to a school based on forecasts for the actual number of students at the beginning of the school year, which has reportedly been the case in Portugal (Liebowitz et al., 2018[51]). In Colombia, central recruitment processes can be very lengthy and cumbersome given capacity challenges in central authorities involved in the process. This may also potentially deter high-quality candidates (Radinger et al., 2018[18]).

3.4.4. Towards an equitable distribution of teaching staff

Designing recruitment criteria and processes

Since the effects of school autonomy for teacher recruitment will also depend on the capacity (and size) of schools, school autonomy could lead to greater disparities in teachers' qualifications and experiences among schools. Schlicht-Schmälzle et al. (2011[124]) confirm a weak positive effect of school autonomy on average performance, but they also find a negative effect on equity.

Teacher allocations through higher-level authorities may help steer a more equitable distribution of teachers across schools and help fill hard-to-staff positions in schools with specific profiles. Engel and Finch (2014[125]) found notable differences in recruitment

practices between advantaged and disadvantaged schools. While advantaged schools could rely on their professional networks to recruit new teachers, disadvantaged schools had to rely to a greater extent on support by their school district to fill positions. In Colombia, authorities responsible for the recruitment of teaching staff have organised specific recruitments to fill hard-to staff schools in rural and remote areas (Radinger et al., 2018[18])

Comparative data from PISA however in fact suggest that both systems with higher-level and school-based teacher recruitment may suffer from inequities in the distribution of teachers (OECD, 2018[4]); something which also the experience of OECD reviews highlights. For example, inequities in the distribution of teachers seemed to be evident for systems with school-based recruitment such as the Flemish Community of Belgium and the Czech Republic but also systems with central recruitment and allocation such as Colombia and Portugal (Nusche et al., 2015[70]; Shewbridge et al., 2016[42]; Radinger et al., 2018[18]; Liebowitz et al., 2018[51]). This essentially highlights the role of other factors, such as the levels of available resources to attract the best teachers, differences in working conditions, and the design of recruitment processes and criteria.

The criteria that systems may have in place for recruitment and allocation decisions, sometimes the result of collective bargaining agreements, combined with teachers' preferences, can contribute to disparities in the distribution of teachers (see Table 3.6). Teachers' qualifications and experience may then influence teachers' employment not only in terms of salary progression, but also the place of employment.

Table 3.6. Priority criteria for selection of teacher candidates (ISCED 1-3), 2018

OECD review countries, public schools

Qualifications	✓	✓									✓		✓	✓		✓		
Experience			✓								✓			✓			✓	
Contr. status	✓	✓																
Evaluation		✓			✓						✓			✓		✓	✓	
Country	Austria (2019)	Belgium (Fl.) (2019)	Belgium (Fr.)	Chile	Colombia	Czech Republic	Denmark	Estonia	Iceland	Kazakhstan	Lithuania	Portugal	Slovak Republic	Slovenia	Spain	Sweden	Turkey	Uruguay

Notes: This table illustrates centrally regulated criteria that need to be taken into account in the selection of candidates into a teaching position. Evaluations may be carried out by education authorities, other public authorities (e.g. civil service commission) or schools/school principals.
For full comparative tables on the recruitment of teachers, see Table A.3. in Annex A.
Source: Based on Country Background Reports and Country Review Reports (http://www.oecd.org/education/school-resources-review/schoolresourcesreview-reportsforparticipatingcountries.htm).

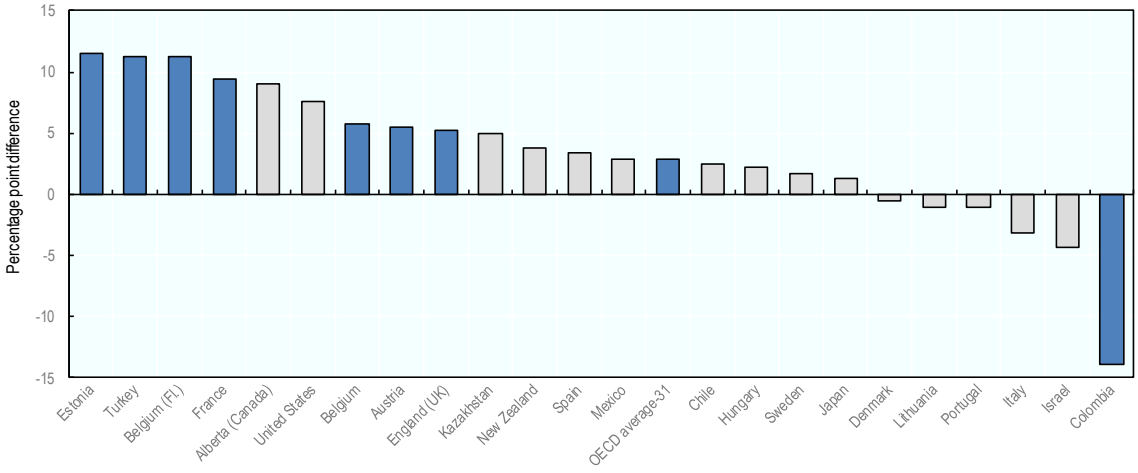
In a number of school systems, teachers' interests rather than students' needs drive the distribution of teachers and make it difficult to match the mix of teachers' experience and skills to school contexts. Where recruitment is centralised, teachers with the highest rank may for example have the first choice for the school they would like to work at. In decentralised systems, schools or sub-national authorities may have to safeguard teachers' statutory rights, such as permanent contracts or higher levels of seniority, when recruiting staff. These practices can result in a mismatch between the needs of schools and teachers' interests and skills. Large proportions of teachers may then work at school where they do not enjoy teaching, possibly concentrated in schools with more difficult working conditions.

Seniority-based systems may also work against novice teachers and fail to reflect the evidence base on teacher effectiveness. New teachers require a placement where they receive sufficient support and can grow into their professional roles. Evidence suggests that teachers' impact on student achievement grows from year to year within their first five years in the profession (Guarino, Santibañez and Daley, 2006[126]). This is also evident looking at data from the TALIS 2018, with new teachers being less likely to feel confident in their teaching skills (OECD, 2019[37]). Teacher labour markets that channel these teachers to the most challenging schools may reduce their sense of efficacy and increase their likelihood of moving to another school or to leave teaching altogether (Luschei and Chudgar, 2017[3]).

Based on the TALIS 2018, on average across OECD countries, novice teachers do tend to work in more challenging schools that have higher concentrations of students from socio-economically disadvantaged homes and immigrant students (OECD, 2019, pp. 139, Figure I.4.9, Table I.4.32[37]). Figure 3.7 shows differences in the distribution of novice teachers across schools with difference socio-economic composition.

Figure 3.7. Distribution of novice teachers by concentration of students from socio-economically disadvantaged homes (ISCED 2), 2018

Difference in percentage of novice teachers between schools with "more than" and, "less than or equal to" 30% of students from socio-economically disadvantaged homes



Notes: Results based on responses of teachers and principals. Novice teachers are teachers with five or less years of teaching experience. Socio-economically disadvantaged homes refers to homes lacking the basic necessities or advantages of life, such as adequate housing, nutrition or medical care. Statistical significant differences are indicated in a darker tone. The number of countries or economies included in the OECD average is indicated next to that average. On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD average reported in this figure, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.
Source: OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en, Table I.4.32.

StatLink https://doi.org/10.1787/888934026544

Shaping staff preferences

The distribution of staff across schools also depends on individuals' preferences and choices and the financial and other incentives for where to work. For the case of teachers, research suggests that, in many school systems, teacher preferences may direct the more qualified and more experienced teachers to schools enrolling mostly students with few socio-economic disadvantages (Bénabou, Kramarz and Prost, 2009[127]; Karsten, 2006[128]; Hanushek, Kain and Rivkin, 2004[129]). This is likely part of the explanation why additional resources, be it in the form of funding or "in-kind" staff allocations as analysed above may not be sufficient to attract and keep better teachers in disadvantaged contexts.

Some school systems have put in place financial incentives (monetary or in-kind) for teachers to work in areas of need, such as higher salaries in schools enrolling high proportions of students from disadvantaged backgrounds. As Table 3.7 shows, such incentives are however rare among OECD Review countries.

Table 3.7. Financial incentives for teachers and school principals to work in disadvantaged or rural contexts (ISCED 1-3), 2018

OECD review countries, public schools

Country	School in a disadvantaged context	School in a rural or remote context
Austria (1)	No	No
Belgium (Fl.)	No	No
Belgium (Fr.)	No	No
Chile (2)	Higher base salary	Varies by role and location
Colombia (3)	No	Higher base salary, Other
Czech Republic	d	d
Denmark	No	No
Estonia (4)	d	d
Iceland	No (teachers); .. (principals)	No (teachers), .. (principals)
Kazakhstan (5)	Salary supplement	Higher base salary, Other (teachers only)
Lithuania (6)	Salary supplement	No
Portugal	No	No
Slovak Republic	Salary bonus (teachers only)	No
Slovenia	No	No
Spain	Annual payment	No
Sweden	d	d
Turkey	Salary bonus	No
Uruguay	Higher base salary, Other (teachers only)	Higher base salary
	Higher base salary	Higher base salary

Notes: School disadvantaged context refers to high concentration of students with special educational needs (SEN), low socio-economic status (SES) or immigrant background.
..: missing
d: at discretion of authorities
1. Austria: Occasionally, (remote) municipalities offer extra benefits such as service accommodation to attract school leaders.
2. Chile: For teachers, the higher base salary amounts to 30% of the national minimum basic salary; for school principals in disadvantaged schools to 25%-200%; for other school leaders in disadvantaged schools to 20%. School leaders in remote areas receive financial compensation (*asignación de zona*), the value of which depends on the location. Teachers in charge of running small remote, multi-grade schools (*profesor encargado*) receive a different bonus.
3. Colombia: National regulations define compensation to attract staff to rural areas that are difficult to reach as designated by regional and local authorities certified to provide education according to specified criteria related to transportation. Staff working in these zones receive a 15% bonus each month over the entitled monthly salary. They also receive special permits to attend pedagogical meetings at the principal site of the school cluster. In addition, they get 5 one-day permits to go to internships in other schools. For specific departments, the Secretary of Education may provide once a year, budget allowing, a plane ticket between the departmental capital and the national capital Bogotá.
4. Estonia: Rural municipalities may offer cheaper accommodation or other benefits
5. Kazakhstan: Salary supplement for teachers and principals working with SEN students of 40% as a share of the baseline salary. Higher base salary (25%) for teachers and principals in rural schools for holding teaching and administrative responsibilities. A scholarship programme to attend initial teacher education targeted at candidates from rural areas requires recipients to teach at least three years in rural areas following graduation. The programme With diploma to the village is targeted at higher education graduates (including teacher education graduates) who work in a village for at least three years.
6. Lithuania: Salary supplement up to 25%. Disadvantage refers to SEN, low SES, immigrant children and non-Lithuanian language background.
6. Uruguay: Mainstream primary schools can operate with different modalities. Full-time schools are dual-scheduled (seven and a half hours per day) and teachers work forty hours per week, *Aprender* schools are simple scheduled schools (four hours per day), located in disadvantaged socio-economic contexts. For a teacher

in a full-time school (40-hour teaching load) and a community teacher, the salary increase reaches 100% of the basic salary (for a 20-hour teaching load), for teachers in special schools 70%, for teachers in rural schools 30% and for teachers in rural schools with a single teacher 50%. "Other" refers to working time incentives for teachers, by providing the possibility to concentrate working hours in one (ISCED 1) or at most two (ISCED 2-3 general) schools. In primary education, for example, teachers typically work at two schools, 20 hours each.
Sources: Based on Country Background Reports and Country Review Reports (http://www.oecd.org/education/school-resources-review/schoolresourcesreview-reportsforparticipatingcountries.htm); OECD (2019), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/f8d7880d-en, Tables D3.7 and D3.11 (web only).

As Vegas and Ganimian (2013[96]) concluded in a review of the evidence from the United States, monetary incentives have shown promising results to allocate teachers where they are most needed (see for example Clotfelter et al. (2008[130]) and Steele et al. (2010[131])). A financial incentive scheme for working in disadvantaged schools in France however did not show positive results (Prost, 2013[52]), highlighting that such incentives will work differently depending on the design and size of the incentives and the general framework for teacher employment and career progression (OECD, 2018[4]).

Financial incentives have also been shown to be effective in attracting teachers to rural schools, although not for remote schools (Pugatch and Schroeder, 2014[132]; Dal Bó, Finan and Rossi, 2013[133]). It may moreover be important to monitor financial allocations over time to ensure they are no longer provided once teachers change schools or the context of a school changes (Urquiola and Vegas, 2005[134]).

However, not only financial aspects are important for the distribution of staff, but also non-financial ones, although more needs to be understood about the relevant importance of each of these aspects. As highlighted in Chapters 1 and 2, teachers are highly motivated by the intrinsic benefits of teaching – working with children and young people and helping them develop and learn as well as opportunities for personal and intellectual growth role (Lortie, 1975[135]). Professional factors matter, such as opportunities to take on additional responsibilities and to engage in research and innovation, and strong leadership and collegiality in professional learning (Shewbridge et al., 2016[42]), as do working conditions, such as class size, preparation time or facilities (Rice, 2010[136]). Research also suggests that accountability pressures inform teachers' preferences of where to work (Feng, Figlio and Sass, 2018[137]; Gjefsen and Gunnes, 2015[138]).

3.5. Staff allocation within schools

Providing adequate and equitable funding for staff employment, attracting and recruiting high-quality professionals, and ensuring a good match between them and schools is not sufficient. Schools also often make resource decisions about the use of their staff, for instance to provide students with learning difficulties or needs with additional support, either within or outside of class. In a study in ten school districts in the United States, Barrett and Toma (2013[139]) show that principals increased the class sizes of teachers they deemed effective based on their own assessments, for example.

Also the allocation of staff to specific students and vice versa within schools needs to be considered to make the best use of expertise and to promote student learning in an efficient and equitable way (Monk, 1987[140]). The optimal matching of teachers and students within schools may help improve effectiveness and efficiency, and be a tool to help retain beginning teachers by assigning them to less challenging classrooms (Feng, 2010[141]).

What is more, the way the school operates and the supports that are available to and within schools play an important role to make staff effective and ensure high-quality teaching for

all students and across a student's time in school (Little and Bartlett, 2010[2]; Johnson, 2009[142]). After all, not all staff within a school will be equally effective, so depending on their class assignment, some students would benefit from more, others from less effective instruction. Likewise, students learn in different classes and move across grades, so their experience over time would not necessarily be consistent and successful (Johnson, 2009[142]). The school's organisation and culture as well as the relationships among staff will likely also influence the decision of staff to stay or to go (Kraft et al., 2015[1]), and the quality of the learning environment that staff can create together (Bellei et al., 2014[143]; Bryk et al., 2010[144]).

The following discusses the assignment of staff to students within school. The role of organisational factors for schools' individual and collective professional capacity is discussed in Chapter 1.

3.5.1. Matching teachers and students within schools

The forming of classes of students and the assignment of teachers to work with these students in a classroom is a regularly occurring organisational feature of schools. Within their organisational structures and available resources, schools create and manage a schedule to provide an educational offer in line with the stipulated curriculum for a particular level of education, matching students, courses, teachers and time in the process.

This may also entail decisions within schools on how many classes to form, which courses to offer, how many students to teach per class, at which time of the school day and in which classrooms. In the most complex case, both students and teachers are matched in a dual assignment process. In the simplest case, there is only one teacher and one group of students, which requires essentially no matching or decision making (Burns and Mason, 1995[145]; Delany, 1991[146]).

The grouping of students (the first part of the matching process) determines both the students' levels of learning a teacher works with and the students' peer group. Where teachers work with a heterogeneous group, they require the capacity to engage learners with a range of abilities. Grouping students by performance, on the other hand, creates more homogeneous classes. While this potentially allows teachers to present material at a more appropriate level and pace, it may also reduce opportunities for lower-performing students to learn from their higher-performing peers (OECD, 2016[147]; Betts, 2011[148]).

Grouping students by different levels of performance may provide one possibility for schools to tailor their staff allocations (and their time and skills) to students' needs, such as creating smaller classes for disadvantaged students who would benefit the most from such an intervention (Betts, 2011[148]). In the United States, Betts and Shkolnik (2000[149]) found that teachers of the lowest ability classes tended to have less experience and qualifications, but that class sizes were smaller for the lowest ability groups.

In Austria, ability grouping was abolished in 2008 with a reform of lower secondary education before it was re-introduced in 2018. When ability grouping was abolished, the teachers that were needed for ability grouping (since ability groups were smaller than classes) were used for team teaching for greater individualisation and differentiation within classes. Since 2018, schools can decide whether to use their available resources for team teaching or for the creation of ability groups (Nusche et al., 2016[41]).

Relatively little is known about the second part of the matching process, that is the assignment of teachers to classes. There is, however, a growing literature on the allocation of teachers to students within schools in the United States. This body of literature illustrates

the role of this part of the matching process for efficiency, but also equity given that the quality of individual teachers can vary substantially within schools (Mansfield, 2015[150]). By allocating teachers to certain levels of education or ability groups, schools determine which students get access to the most effective teachers (Allen and Sims, 2018[151]).

Evidence from the United States suggests that the assignment of teachers to students is typically not random. Kalogrides et al. (2013[152]) looked at differences in the classrooms assignment of teachers teaching the same grade in the same school in a given year in a large urban school district. They find that teachers are sorted by characteristics, such as gender, ethnicity, experience, leadership role and attendance of a more selective undergraduate institution at all levels of school education. This sorting also led to differences in the assignment to more experienced or more highly qualified teachers who were more likely to teach classes with advantaged students. Similarly, Feng (2010[141]) found in a study of schools in Florida (United States) that beginning teachers were more likely to teach classrooms with a larger share of low-performing students with low discipline and students from disadvantaged backgrounds.

In a study of public schools in North Carolina (United States), Horoi and Ost (2015[153]) examined the assignment of students in Grades 4 and 5 that changed schools. Although schools receiving these transfer students likely have more limited information about them when making classroom assignments, their assignment was again found not to be random. Transfer students, and particularly those with low achievement or with a minority background, tended to be assigned to less experienced teachers compared to non-transfer students; emotionally disabled, low-achieving and male transfer students were all more likely to be assigned to male teachers. Lastly, transfer students from an ethnic minority were more likely to be assigned to minority teachers.

The impact of such assignments within schools on inequities in student learning over time relative to inequities created through teacher resource differences between schools is likely limited. A study on inequities in the distribution of teacher quality across all schools in the state of Washington (United States) found that inequities across classrooms also contributed to inequities in access to quality teachers as measured through value-added, but that most of the overall teacher quality gap came from sorting across school districts and schools (Goldhaber, Lavery and Theobald, 2015[5]). Mansfield (2015[150]) analysed teacher allocations within and across public high schools in North Carolina (United States) and their relation to inequities in student test scores. In his study, differences in quality among teachers from the same school only minimally contributed to differences in performance across students over their high school careers as most students were taught by a mix of their schools' more and less effective teachers.

How are teachers assigned within schools?

Schools need to decide about the assignment of their teachers to particular grades, subjects and classes. The decision-making responsibilities and processes will differ across schools. School leaders will generally be responsible for ensuring students' instruction across the curricular areas with their available staff, but in some schools the process may be more centralised while in others it may be more devolved to staff (Dabach, 2015[154]).

In general, the matching of students and instruction occurs within an environment of constraints, uncertainty and change (e.g. of the curriculum, graduation and tertiary entrance requirements). More specifically, the profile of the staff in a school together with qualification requirements will set the parameters for how teachers can be deployed in a school (Delany, 1991[146]). In primary schools, teachers are often generalists which makes

their assignment more flexible (Cohen-Vogel, 2011[155]). In secondary education, specific courses will require particular qualifications or level of expertise which may then influence the sorting of teachers across grades and subjects (Kalogrides, Loeb and Béteille, 2013[152]).

Also teachers' contracts and teaching load requirements will put certain constraints on class assignments. Teaching staff and their time are furthermore always limited and shortages of staff may make trade-offs inevitable. School leaders may then see themselves required to assign teachers to subjects for which they have not been prepared to cover instruction time (Ingersoll, 2005[156]).

The ways in which schools are organised will set certain conditions on the allocation of staff. In some school systems, schools are organised in clusters across multiple sites or across different shifts. In some OECD review countries, such a clustering has been pursued through central policies. In Colombia, public schools have been organised in clusters that group different sites under a common leadership to smooth students' transitions based on national legislation. Schools have furthermore historically operated in double shifts, one in the morning and one in the afternoon, to expand coverage, although the government has been moving towards a longer school day (*jornada única*) (Radinger et al., 2018[18]). Similarly, Portugal has clustered schools as part of a national programme (Liebowitz et al., 2018[51]).

In other school systems, the organisation of schools bas been left to the local level. In Austria, an educational reform in 2016 established benchmarks for the number of students in a school and the possibility for schools to form a cluster (Nusche et al., 2016[41]). In Denmark, the local reorganisation of schools also resulted in schools under one leadership as a way of consolidating without closing school buildings (Nusche et al., 2016[34]).

The organisation of schools in multiple sites or multiple shifts provides flexibility for the allocation of teachers, but also creates demands for school leadership for the assignment and management of teachers. In particular, it creates challenges where distances are long, such as in remote areas, for example to assign teachers to work with students on different sites over the course of a school day. Further difficulties might arise given the separation of levels of education across different sites (OECD, 2018[25]).

Classroom assignments as a political process that is influenced through internal and external pressures

School leaders, teachers, parents and students all have a stake in classroom assignments within schools. School leaders, be it at senior or middle levels, may pursue objectives related to student learning or staff and organisational management. Leaders may seek to tailor class assignments to the perceived strengths and weaknesses of teachers, to support struggling students or to raise overall school achievement. Or they may use class assignments to promote staff satisfaction and retention or to minimise conflict in the school community. As Player (2010[157]) found, principals may also reward teachers by assigning them to particular classes.

Teachers likely also have preferences over their assignment to specific subjects, grades and students, as do parents and students over who teaches. The assignment of teachers is then likely a complex political process with school leaders attempting to balance short- and long-term organisational goals while responding to preferences by teachers, parents and students (Kalogrides, Loeb and Béteille, 2013[152]; Cohen-Vogel, 2011[155]).

School leaders may involve teachers, parents and students to different degrees in their assignment decisions, also to potentially benefit from their knowledge on what they perceive to be the best learning environments for their students or children. Teachers and parents may provide information on students' behaviours, learning styles, personalities, and interactions with their peers, prior teachers, and general teacher types (Paufler and Amrein-Beardsley, 2014[158]). Where school leaders are new to a school, they may have to rely in particular on the insights of their teaching staff on how to group students and assign teachers (Monk, 1987[140]). School leaders may also use assessment data to assign teachers to particular grades, subjects and classes (Cohen-Vogel, 2011[155]).

Different agents may have different leverage over assignment decisions. More experienced teachers may be able to lobby their leadership to teach less challenging classrooms as they have built stronger ties over time (Grissom, Kalogrides and Loeb, 2015[159]). This was also evident in some OECD review countries. In Austria, some teachers reported conflict between beginning and experienced teachers in a school, with beginning teachers being given potentially more difficult classes (Nusche et al., 2016[41]). In Colombia, beginning teachers reported being more likely assigned to smaller and more remote school sites (Radinger et al., 2018[18]). Also some parents, typically those from more advantaged backgrounds, may be more likely to request that their children are assigned to a particular teacher (Qureshi and Ost, 2018[160]; Jacob and Lefgren, 2007[161]).

More central policies, such as accountability pressures or qualification requirements, may also influence teacher allocations within schools. Test-based accountability systems can set strong incentives to assign the most effective teachers to subjects and grades levels with high-stakes examinations that influence rewards and sanctions for schools (Grissom, Kalogrides and Loeb, 2017[162]; Chingos and West, 2011[163]). This could lead to the assignment of less effective teachers to earlier years even though returns at these levels are greatest (Fuller and Ladd, 2013[164]).

Changes to teachers' qualification requirements for teaching particular courses or students' course taking requirements may also influence the staffing of schools. In California (United States), the implementation of accountability policies and changes to credential requirements led to pressures on schools to staff courses for English learners with new teachers who were authorised to teach these courses since more experienced teachers had not acquired the necessary credentials during their preparation (Dabach, 2015[154]). In England (United Kingdom), students with low performance in mathematics have been required to continue studying the subject until the age of 18. Shortages of mathematics teachers have led to the staffing of these retake and advanced classes with the most experienced and qualified teachers (Allen and Sims, 2018[151]).

Grade reassignments, looping, specialisation and departmentalisation

The assignment of teachers to a grade or subject across years also has a role to play for students and teachers in terms of learning outcomes and turnover. The reassignment of a teacher to a new grade for instance may have an impact on their workload (e.g. preparation for lesson plans) and use of grade-specific skills, and therefore induce staff turnover and harm learning (Atteberry, Loeb and Wyckoff, 2016[165]; Ost and Schiman, 2015[166]).

Brummet et al. (2017[167]) examined the frequency and predictors of within-school teacher grade-level switching using both longitudinal administrative data from the state of Michigan and nationally representative survey data for the United States. As they found, about 7% of classroom teachers change grades following any given school year.

Inexperienced teachers are relatively more likely to switch grades, and grade-level reassignments are inequitably distributed across both schools and students.

At the primary level, there is a question if teachers instruct all core subject to their class or if they specialise in specific subjects in the higher primary level grades, also referred to as "departmentalised instruction". "Departmentalised instruction" may allow teachers to concentrate planning on fewer subjects, which may lead to more thoughtful lessons and deeper instructional or content knowledge in those subjects. Fryer (2018[168]) however finds that teacher specialisation reduces student achievement, arguing that this may be caused by teachers having fewer interactions with each student.

Hill and Jones (2018[169]) in fact provide evidence for the academic benefits of student-teacher familiarity at the primary level through "looping", that is having students and teachers progress through the early school years together. The effects were largest for minority students, and for students with generally less effective teachers (as measured by value added).

Such "looping" practices are common in some OECD review countries. In Kazakhstan, the same classroom composition and teacher is typically maintained during the first four grades of primary education, which has been found to provide a number of benefits for primary school students, such as consistency in the curriculum delivery and stronger relationships among students, teachers and parents (OECD/The World Bank, 2015[60]). In Slovenia, basic education (ISCED 1 and 2) comprises three three-year cycles. In the first three-year cycle, children are taught by a generalist teacher and it is recommended that the same teacher teaches the class for all three years. In the second cycle, the generalist teacher still delivers most lessons, but individual subjects are gradually taken over by specialist subject teachers. In the third cycle, lessons are delivered by specialist subject teachers (Slovenian Ministry of Education, 2017[71]).

3.5.2. Handling staff absences within schools

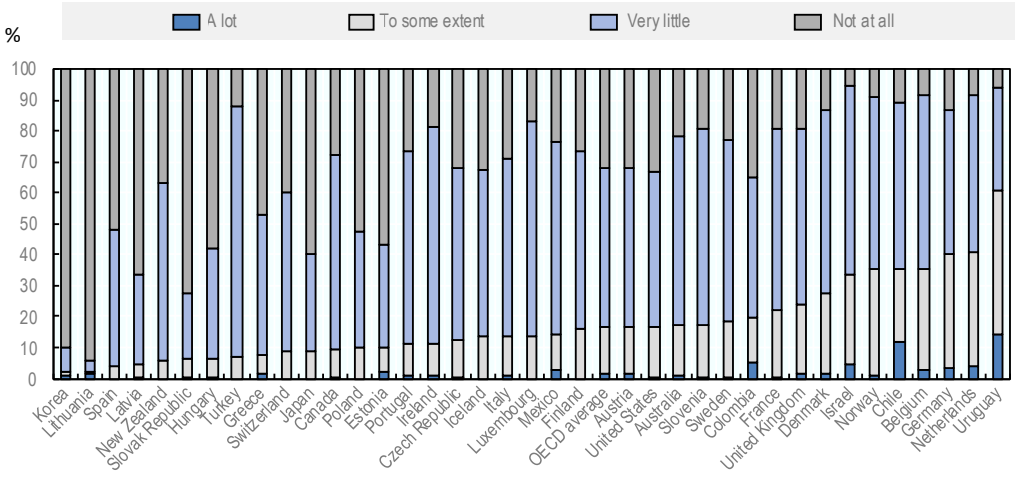
What is the impact of staff absences on schools and students, and how do schools ensure continued learning?

Teacher absenteeism is an unavoidable feature of education systems. At some point in time, all teachers will experience illness or family emergencies and need to be replaced temporarily.

The PISA 2015 provides some insights into the extent to which school principals perceive teacher absenteeism as hindering student learning. Across OECD countries, 17% of 15-year-old students were enrolled in schools whose principal reported that students' learning is hindered by teacher absenteeism at least "to some extent" (see Figure 3.8) (OECD, 2016, pp. 457, Table II.3.17[147]). The extent to which absenteeism hinders learning, as reported by principals, however, differs considerably across and within countries. In the most disadvantaged, schools, 18% of students had principals who reported so, compared to only 13% of students in the most advantaged schools, a significant difference of 5 percentage points (OECD, 2018, pp. 162, Table 3.9[4]). This is echoed in national studies from Germany and the United States, for example (Helbig and Nikolai, 2019[170]; Clotfelter, Ladd and Vigdor, 2009[171]).

Figure 3.8. Teacher absenteeism hindering student learning, 2015

Percentage of principals reporting that teacher absenteeism hinders student learning to the following extent:



Note: Countries and economies are ranked in ascending order of the percentage of principals who reported teacher absences hinder student learning to "some extent" and "a lot".
Source: OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, OECD Publishing, Paris, https://doi.org/10.1787/9789264267510-en, Table II.3.17.

StatLink https://doi.org/10.1787/888934026563

It is then critical to understand and address issues of absenteeism in specific contexts and the reason behind them (Guerrero et al., 2013[172]), but also how teachers are replaced in their classrooms when they are absent, not least since some research has identified a negative relationship between teacher absences and students' test scores (Herrmann and Rockoff, 2012[173]; Miller, Murnane and Willett, 2008[174]). The research carried out by Miller et al. (2008[174]), for instance, indicates a small, statistically significant, negative impact of teacher absences on learning outcomes, with test scores decreasing by 3.3% of a standard deviation for each ten days of absence.

Many countries have a decentralised system of substitute teacher recruitment (e.g. Ireland) while some have a centralised system (e.g. primary education in France). Where the replacement of teachers through substitutes takes places at the school level, personal arrangements can aid in recruitment. Schools often seem to have a directory of substitute teachers' contact details, generally compiled over time such that substitute teachers who had previously substituted at the school and were successful would be added to aid future recruitment. The creation of this list seems to usually be based on the relationships that substitute teachers formed during their time, whether they had a positive experience or not, and whether full-time teachers and school leaders felt they had done a good job.

Technological advancements have resulted in new methods for finding substitute teachers through a range of mechanisms, including phone, text and mobile application services. The recruitment of substitute teachers may furthermore involve outsourcing, for example through agency recruitment. Where principals are responsible for recruitment, this may give them more time to carry out their other responsibilities instead of recruiting substitute teachers. At the same time, however, principals may lose control over the quality of the substitute teacher employed at their school. Depending on regulations and quality

assurance, agencies may also be characterised by a lack of universal standards and thus negatively impact students' learning if lower quality substitutes are deployed to schools.

In the United Kingdom, agency recruitment has grown rapidly. In England and Wales, substitute teacher recruitment through agencies has increased from 63% in 2014 to 79% in 2017 while recruitment by schools and local authorities has decreased from 40% to 27% and 17% to 7% respectively during the same time period (NASUWT, 2017[175]). As the use of supply agencies has been growing, issues surrounding these agencies have emerged, primarily around agency fees, salary rates and the exclusion from benefit entitlements. There have also been serious issues over the cost of these agencies for schools and substitute teachers such that these agencies typically earn GBP 40-50 (British pounds) per substitute teacher per day (Balakrishnan, 2017[176]).

Box 3.7 highlights two interesting examples to support a more effective and efficient recruitment of substitute teachers: the work of Substantial Classrooms, a United States-based non-profit organisation, and a pilot project for substitute teacher recruitment in the Flemish Community of Belgium.

Box 3.7. Building capacity for the recruitment of substitutes

Creation of a substitute teacher pool, Flemish Community of Belgium

The Flemish Community of Belgium has recently put in place pilot projects to support school boards in replacing absent teachers through a substitute pool of teachers.

For primary education, the Flemish government has been funding 350 full-time equivalent teachers who are allocated to so-called "teacher platforms" in which schools collaborate and share substitute staff. Almost all primary schools have been participating in the project.

The teacher platforms can hire staff for one full year with these full-time equivalents on the condition that the staff member is used for replacements of less than a year or gets a stable task and that another, more experienced, staff member is used for replacements of less than one year. The staff member hired through the platform is appointed to one or more schools belonging to the platform. Staff members hired through this scheme need to hold at least a part-time appointment, which does not need to be solely through employment with the teacher platform. For example, a teacher can have a 30% workload through a regular appointment at a school belonging to the platform and a further 20% through the platform itself. Where working time or employment arrangements of staff belonging to a platform change over the year, the working time available within the platform is adjusted.

In case no replacement is needed due to staff absences, staff from the teacher platform perform other pedagogical tasks such as co-teaching or supporting their peers. Full-time equivalent teachers who are hired through the teacher platform are expected to be deployed for replacements for 85% of the time. If less time is spent on substitution in a year, less full-time equivalent teachers will be funded the following year. If more time was spent on substitution, more resources are provided subsequently.

The project started in October 2018 and has been monitored in co-operation with the labour unions and social partners. Depending on the experience, the project will be continued and/or adjustments will be made. A similar pilot has been underway for secondary education, albeit at a smaller scope this pilot is limited to 16 collaboration platforms and 350 full-time equivalent teachers have been funded by the state government.

Source: Information provided by the Ministry of Education and Training, Flemish Community of Belgium.

Substantial Classroom initiative, United States

Founded in 2016, Substantial Classrooms aims to improve the substitute teacher experience for student and substitute teachers alike by working with school districts, non-profit organisations and individual schools across the United States. The primary objective of the initiative is to ensure that student learning time is used in the most efficient and effective way, replacing "wasted days" and "play days" with days of meaningful learning. Two distinct services – the development of leadership capacity and substitute data dashboards – focus on improving the recruitment and deployment of substitute teachers.

Substantial Classrooms aims to build leadership capacity at all levels. The Substitute System Leaders Academy provides a ten-week course for staff involved in the organisation of substitute teaching. The first component – strategic focus – aims to increase awareness of and deal with substitute teacher shortages. The second component – vision and planning – allows staff to analyse available data and make immediate changes in light of these findings. The third component – design thinking and continuous improvement – involves equipping participants with the skills necessary to make changes happen in a complex system through a coaching system.

The programme's second element, a substitute data dashboard provides insights into the demand and supply of substitute teachers and allows school administrators to better manage their substitute pool. This data can be analysed to identify the types of substitute teacher requests such as pre-planned, last minute and long-term absences. It also provides information about the pool of substitute teachers, such as the absolute size of the pool and the proportion of active substitutes. Finally, individual school profiles, reasons for teachers' absences, disaggregated by day and month and school types are also available.

Source: Substantial Classrooms, https://substantialclassrooms.org (accessed 20 July 2019).

3.6. Policy options

3.6.1. Monitoring demand and supply of teachers, school leaders and other school staff to identify and address imbalances

Adequate monitoring and forecasting mechanisms (e.g. through the use of rigorous supply and demand studies) that take into account a wide range of factors, including the higher education and labour market context, provide important information on the future demand for staff with specific competencies and facilitate the steering of the labour market. Based on this information, authorities can develop strategies to address potential shortages and/or oversupply of staff. In systems with shortages, authorities can for example implement measures to further increase the attractiveness of a career in schools, such as scholarship, grant or loan programmes; financial bonuses for specific geographical regions; and recruitment campaigns to attract staff in areas of need.

Research on teacher preferences suggests that teachers typically prefer to work close to their homes, families and friends, even when they gain their initial teaching qualification elsewhere. This indicates that teacher labour markets are geographically relatively small and the pool of prospective teachers available to work in a given school is limited. In specific areas facing teacher shortages, "Grow your own" strategies can therefore play an essential role for meeting the demand for teachers.

In systems with an oversupply, authorities can develop strategies for reallocating, redeploying and retiring staff currently in schools. Some staff could assume new responsibilities, such as advisory roles within or across schools. Staff close to retirement could be offered early retirement packages. At the same time, systems with an oversupply need to plan ahead, ensure an adequate renewal of staff to provide the system with new ideas and perspectives, and address potential shortages in specific areas. Systems with an adequate supply of staff have an opportunity to be more selective about those who enter the profession and teacher education programmes (see Chapter 3 on entry requirements). Establishing a dialogue among researchers, policy makers and the profession in analysing forecasting data is key to identify problems in supply and develop timely solutions.

3.6.2. Managing resources for school staffing

Adjusting staffing levels to changing needs

Stability and predictability in available resources are important so that employers – be it a school or an education authority – can plan their staff levels and mix over several years, but a degree of flexibility in staff resourcing is also necessary to respond to unforeseen needs, such as changes in student enrolment.

There are two main approaches for resource allocations for staff. In systems where staff employment is centralised above the school level, schools typically receive "in-kind" staff allocations. In systems where schools are themselves responsible for staff employment, they typically receive monetary resources which they can use to hire and employ their own staff. Monetary transfers without restrictions give individual schools the greatest level of autonomy in terms of staff spending. By contrast, monetary transfers that are earmarked for a particular staff category, as well as the in-kind provision of staff, allow the allocating authority to retain a degree of control over schools' staffing levels and mix.

Staff funding may also be earmarked for the benefit of specific student groups, such as special needs students, while giving schools discretion over who to hire for this purpose. For example, some countries have dedicated funding programmes that help schools finance multidisciplinary teams including specialists such as speech therapists and psychologists to support inclusive education across classrooms.

In systems with central teacher allocations, central transfers of staff can help adjust staffing levels to changes in enrolment in different schools, possibly together with a reorganisation of the school network or of school leadership structures, for example by creating school clusters with multiple sites.

In systems with decentralised employment, central education authorities can support schools in adjusting their staffing levels, for example by managing redeployment processes, facilitating the transfer of teachers on permanent contracts, helping schools cover the costs when disestablishing permanent teaching positions, or promoting multi-school staffing models that enable two or more schools to temporarily transfer staff between them. While temporary employment contracts are an important tool to ensure flexibility in staff management, school systems should ensure an adequate balance between staff on permanent and temporary contracts, and adequate working conditions for all staff.

Teacher mobility will also be important to adjust staffing levels to changing demographics across a school system as a whole. In a number of systems, teacher mobility is hindered by inefficiencies and rigidities in the teacher labour market. To reduce such rigidities, teachers should be able to carry their statutory rights (e.g. pension entitlements and salary levels)

with them when moving across sub-systems. Other administrative hurdles may also need to be cleared, such as processes for sub-systems to manage teacher transfers between authorities. In systems with limited mobility of teachers between schools overall, incentives or regulations could be introduced to encourage such mobility, which should be monitored and evaluated for their effectiveness.

Reviewing the mix of staff and their use of time in schools

The presence of different types of staff besides teachers and school leaders and their role for the provision of education and students' learning experience is increasingly being recognised (also see Annex 1.A in Chapter 1). While some staff may support instruction in the classroom, such as teacher aides, others support the instructional programme more broadly or provide social and health support for students. Yet others provide administrative and managerial assistance, support the maintenance and operations of schools and provide important ancillary services, such as transportation and school meals.

Much remains to be understood about the role of other types of staff besides teachers and school leaders, but the availability of a wide range of staff in and for schools has the potential to enable schools to better meet their individual students' academic, social and emotional needs. In the context of evolving social and educational contexts, such as changing family patterns or increasing diversity in schools and classrooms, professional pedagogical, health and social support likely plays an ever more relevant role for schools.

Decisions about the mix of staff in schools however involve complex trade-offs in the use of resources that need to be informed by relevant data and evidence. They also require consensus about the types of tasks and responsibilities that are expected of teachers and school leaders and the roles they may take on as they develop in their career as discussed in Chapter 2. The types of staff that are available should support schools' in realising their educational project for their students, and schools should have some level of influence over their staffing mix.

Needs-assessment studies are one tool to help determine the staffing needs of schools and inform future resource allocations. Such studies would examine what roles are currently performed by staff, how their time is spent, what needs schools have and which types of staff would help fulfil related responsibilities. They would estimate appropriate levels of different types of staff or the comparative levels of need for schools with different demographics. In the United States, for instance, evidence exists both on the optimal guidance counsellor to student ratio (one counsellor per 250 students on average for all schools) (NACAC, 2018[177]) as well as on their causal impacts on student outcomes (Hurwitz and Howell, 2013[178]).

As part of such a needs-assessment, it would be valuable to explore the extent to which identified needs could be addressed by investing in increased training for all school staff, including teachers. In some cases, such investments may be a more efficient and effective use of resources than the employment of additional untrained support staff. In other cases, identified needs may require the employment of additional staff and changes to the staffing mix, which may imply a potential decrease in the number of regular teachers. Schools in greatest need should be given priority in resource allocations. Where staff can be employed to respond to less complex school needs (e.g. procurement or student discipline), a change in the staffing mix may secure potential savings.

Governance and funding for the employment of different types of staff, including teacher and school leaders, will shape the staff mix in school systems. In decentralised systems,

regulations and funding allocations provide potential steering mechanisms, for instance in the form of minimum staffing ratios or targeted funding. Horizontal and bottom-up accountability (e.g. through school boards) can help ensure an effective use of resources for school staffing (OECD, 2017[79]). Where responsibilities for the employment and funding of different types of staff are split, collaboration will be essential to manage the effective staffing of schools and related trade-offs. This includes relevant authorities outside of the school sector which may provide essential professional support services.

The effective provision of staff also depends on the effective organisation of the school network (OECD, 2018[25]). Where feasible in terms of geography, the sharing of specialised staff across a number of schools may help ensure a broad provision of related services, though it may involve trade-offs in the level of involvement and collaboration that can be expected of staff in individual schools. Where the organisation of school education changes, such as a change to learning time, a reflection about the funding of different types of staff is often necessary as is a review of the preparation and training of different types of staff and the introduction of potentially new staff roles.

3.6.3. Matching staff with schools and students

Collaborating for the effective recruitment of teachers and school leaders, and ensuring fairness and transparency in recruitment processes

In a number of countries, schools have limited influence on hiring decisions, which may be a source for mismatches and frustrations for both schools and teachers alike. Such systems could consider policies to give schools gradually greater autonomy to select their staff. Schools could be able to express their preferences over a given number of candidates ranked in a central process who have expressed an interest in working at the school or be involved in the interview and selection process. Another option is to allow schools to select part of their teaching staff while institutions above the school level remain in charge of recruiting and assigning the remaining part of the teaching force.

In Germany, the use of such a mixed system is quite common, for example, which ensures that common standards are applied and that particular schools are not systematically disadvantaged. Such mixed systems could also take off some logistical and administrative demands that are associated with recruitment, such as screening applicants, managing databases of applicants, extending the formal job offer, and processing new hires.

Steps to give schools a greater say in the distribution of teachers will need to pay adequate attention to potential inequities resulting from such a policy change and other factors, such as arrangements for funding staff positions. More advantaged schools will be better able to attract the most qualified teachers. School autonomy for recruitment requires sufficient leadership, managerial and administrative capacity, school resources and size, as well as sufficient supports and incentives for teachers to be willing to work in disadvantaged contexts.

Student teacher placements during their initial education may provide one route for schools to identify good teachers that match their organisational culture as they provide time for observing these potential teachers in the classroom. At the same time, student teachers have a chance to get to know a school and its ethos and culture. Student teacher placements may therefore have implications for the distribution of teachers among schools (Cannata, 2011[119]). In the Netherlands, the practical training of teachers includes a mandatory internship. Internships can be an opportunity to "try before they buy", i.e. allowing schools to recruit teachers with the right fit. In Norway, the possibility to enter the profession as a

teaching assistant for those who are completing their studies or beginning in their careers has similar advantages. Former assistants are sometimes hired after a successful practicum (OECD, 2019[59]).

In systems where schools are more directly involved in teacher recruitment and selection, a priority should be to improve information flows. Transparent and timely information systems can help close information gaps between teachers and schools. At the same time, schools should be required to widely advertise their vacancies.

3.6.4. Working towards equity in the distribution of staff across schools

Ensuring equitable and transparent resource allocations for school staffing

A key concern to provide equity in the distribution of staff across schools lies in the design and implementation of equitable funding allocation mechanisms. The review's dedicated report on school funding provides an in-depth analysis (see OECD (2017[79])).

To support greater equity within a school system, funding systems should be based on a balance between targeted and regular funding. For the distribution of regular funding for current expenditures such as staff salaries, the use of a well-designed funding formula can provide an efficient, equitable, stable and transparent method of distributing resources, and a clear framework for debates on the sufficiency and equity of resource allocations. Equitable funding systems also require reliable evidence on the adequacy of funding in general, and on specific elements that funding mechanisms aim to address, such as inequities related to socio-economic disadvantage or geographical location.

Where responsibilities for the funding of staff are decentralised, sub-national authorities need to have both adequate revenues to meet the needs of their schools and students and relevant capacity to fulfil their funding responsibilities, which can be supported through well-designed equalisation mechanisms.

Many countries show a considerable financial commitment to supporting students at risk of under-performance, including through additional resources that can be used for school staffing. This focus on additional inputs needs to be matched with sufficient attention to monitoring the outcomes for different student groups. Thematic studies on the use of resources for equity are one option for monitoring the equity of the school system.

No matter how well-designed a new funding allocation mechanism is, however, there will always be winners and losers when implementing a new model unless additional resources are made available. Experiences in many countries therefore highlight the importance of effectively managing the political economy of funding reform and of having a realistic estimate of the costs involved.

Reviewing regulations and criteria for recruitment, allocation and transfers

In a number of school systems, teachers' interests rather than students' needs drive the distribution of teachers. Rules and regulations for the selection and transfer of teachers, such as the weight of seniority, together with teachers' preferences for working in particular contexts, may channel the best teachers to the most advantaged schools. Beginning teachers are then mostly assigned to schools that are more difficult, potentially harming student learning and teacher retention and satisfaction. Regulations that give priority to candidates with specific types of appointment or levels of experience may also make it more difficult to match the mix of experiences and skills of teaching staff to school contexts. To address these concerns, it could prove useful to review such regulations, creating greater flexibility

for appointments regardless of employment status or experience. Recognising experience in difficult or remote schools for teachers' career progression is a further possibility.

Providing incentives for teachers and school leaders to work in high-need areas

In some contexts, monetary incentives have shown promising results to distribute teachers where they are most needed. One consideration then is to put in place financial incentives for staff to work in areas of need, such as higher salaries in schools enrolling high proportions of students from disadvantaged backgrounds, differential pay for particular expertise, or scholarships and subsidies for working in disadvantaged schools. But such policies will work differently depending on the design and size of the incentives and the general framework for employment and career progression (Chapter 2). Financial incentive schemes therefore require adequate evaluation and monitoring, also to inform the dialogue between decision makers and stakeholders and facilitate implementation and potential adjustments. In some contexts, financial incentives have been shown to be effective in attracting teachers to rural schools, but less so for remote schools, for example.

Of course, non-financial incentives also matter, although more needs to be understood about the relative importance of financial and non-financial aspects. Research shows that most teachers are highly motivated by the intrinsic benefits of teaching namely working with children and young people and helping them develop and learn. Professional factors, such as opportunities to take on extra responsibilities and strong leadership and collegiality in professional learning, then also need to be considered, as do working conditions, such as preparation time, accountability demands, class size or facilities. In other words, it is essential to ensure that all schools, and especially those in challenging circumstances, provide attractive conditions for staff to work in.

3.6.5. Preparing school leaders for effective staff assignments within schools

At the level of each individual school, the allocation of staff to specific students also plays an important role in best using teachers' expertise and promoting the learning of all students. Evidence from some contexts suggests that the assignment of teachers to students is typically not random. Teachers' characteristics, such as gender, ethnicity and experience may influence their assignment to particular student groups, with studies from the United States finding that experienced or more highly qualified teachers are more likely to teach classes with advantaged students.

The assignment of teachers to students is typically a school-level process, in which school leaders have to balance short- and long-term organisational goals while responding to preferences of teachers, parents and students. School leaders may seek to tailor class assignments to the perceived strengths and weaknesses of teachers, to promote staff satisfaction and retention, or to respond to parental demands and minimise conflict within the school community.

Hence, making the best use of staff time and competencies requires sufficient attention to the human resource management capacity in schools (e.g. planning the co-ordination time between teachers and learning support staff). School leadership needs to be adequately prepared to manage staff assignments and time with the resources they have at their disposal and to assess and monitor the effects of their decisions on student learning and well-being (e.g. the use of differential class size). Schools should also have the ability to develop their staff through arrangements such as team teaching and by matching effective with less effective teachers in their school (see Chapter 4).

Notes

[1] In Colombia, public schools are organised in school clusters with a main school site typically offering all levels of education, including higher levels, and a number of smaller school sites offering only some levels of education.

[2] In Colombia, decentralisation in education has been managed by a process of certification of departments (the regional level) and districts and municipalities (the local level). All departments and large municipalities are certified to provide pre-school and school education. Education in municipalities that have not been certified is under the responsibility of the respective department.

[3] In 2017, national legislation transferred responsibility for the provision of public school education in Chile from local authorities (municipalities) to a new intermediate level in the form of local education services. Local education services are led by a national Directorate for Public Education within the Chilean Ministry of Education. Responsibilities are being transferred gradually until 2025 (with an intermediate evaluation to review the process and the possibility for the President of the Republic to postpone completion of the transfer until 2030). Where local education services act as school providers, the school principal should propose teachers' professional profiles and titular positions and participate in the selection of teachers and education assistants of education.

[4] Officially recognised schooling in the Flemish Community of Belgium is organised within three educational networks: a) the Community education network (*Onderwijs van de Vlaamse Gemeenschap*, GO!) which acts under the authority of the Flemish Community government; b) the publicly funded and publicly managed education network (*Officieel gesubsidieerd onderwijs*, OGO), also referred to as grant-aided public education, which includes schools organised by the provincial and city/municipal authorities; and c) the publicly funded and privately managed education network (*Vrij gesubsidieerd onderwijs*,VGO), also referred to as grant-aided private education, which includes denominational and non-denominational schools.

References

Abbiati, G., G. Argentin and T. Gerosa (2017), "Different teachers for different students? Evidence on teacher-student matching and its consequences in the Italian case", *Politica Economica, Journal of Economic Policy*, Vol. 1, pp. 12-58, http://dx.doi.org/10.1429/86375. [11]

Adamson, F. and L. Darling-Hammond (2012), "Funding disparities and the inequitable distribution of teachers: Evaluating sources and solutions", *Education Policy Analysis Archives*, Vol. 20/37, http://epaa.asu.edu/ojs/article/view/1053. [81]

AITSL (2018), *Annual Report 2017-2018 The Australian Institute for Teaching and School Leadership*, Australian Institute for Teaching and School Leadership (AITSL), Melbourne, http://www.aitsl.edu.au (accessed on 31 March 2019). [44]

Allen, R., S. Burgess and J. Mayo (2017), "The teacher labour market, teacher turnover and disadvantaged schools: New evidence for England", *Education Economics*, Vol. 26/1, pp. 4-23, http://dx.doi.org/10.1080/09645292.2017.1366425. [12]

Allen, R. and S. Sims (2018), *How do shortages of maths teachers affect the within-school allocation of maths teachers to pupils?*, Nuffield Foundation, London, http://www.nuffieldfoundation.org (accessed on 10 March 2019). [151]

Atteberry, A., S. Loeb and J. Wyckoff (2016), "Teacher churning: Reassignment rates and implications for student achievement", *Educational Evaluation and Policy Analysis*, Vol. 39/1, pp. 3-30, http://dx.doi.org/10.3102/0162373716659929. [165]

Ávalos, B. (2008), "Teacher education in the Latin American region: an unfinished business", *Southern African Review of Education*, Vol. 14/1-2, pp. 9-27, https://hdl.handle.net/10520/EJC98942. [50]

Balakrishnan, V. (2017), *Technological disruption in the teacher supply market*, Grant Thornton, London, https://www.grantthornton.co.uk/insights/technological-disruption-in-the-teacher-supply-market/ (accessed on 18 June 2019). [176]

Barbieri, G., C. Rossetti and P. Sestito (2011), "The determinants of teacher mobility: Evidence using Italian teachers' transfer applications", *Economics of Education Review*, Vol. 30/6, pp. 1430-1444, http://dx.doi.org/10.1016/j.econedurev.2011.07.010. [55]

Barrett, N. and E. Toma (2013), "Reward or punishment? Class size and teacher quality", *Economics of Education Review*, Vol. 35, pp. 41-52, http://dx.doi.org/10.1016/j.econedurev.2013.03.001. [139]

Behrman, J. et al. (2016), "Teacher quality in public and private schools under a voucher system: The case of Chile", *Journal of Labor Economics*, Vol. 34/2, pp. 319-362, http://dx.doi.org/10.1086/683642. [27]

Behrstock-Sherratt, E. (2016), *Creating coherence in the teacher shortage debate: What policy leaders should know and do*, American Institutes of Research, Washington, DC, https://www.air.org (accessed on 15 February 2019). [43]

Bellei, C. et al. (2014), *Lo apredí en la escuela: ¿Cómo se logran procesos de mejoramiento escolar?*, Lom Ediciones; Universidad de Chile; UNICEF, Santiago, Chile. [143]

Bénabou, R., F. Kramarz and C. Prost (2009), "The French zones d'éducation prioritaire: Much ado about nothing?", *Economics of Education Review*, Vol. 28/3, pp. 345-356, http://dx.doi.org/10.1016/j.econedurev.2008.04.005. [127]

Bense, K. (2016), "International teacher mobility and migration: A review and synthesis of the current empirical research and literature", *Educational Research Review*, Vol. 17, pp. 37-49, http://dx.doi.org/10.1016/j.edurev.2015.12.001. [66]

Bertoni, E. et al. (2018), "School Finance in Latin America: A Conceptual Framework and a Review of Policies", *IDB Technical Notes*, No. 1503, Inter-American Development Bank, http://dx.doi.org/10.18235/0001306. [76]

Betts, J. (2011), "The Economics of Tracking in Education", in *Handbook of the Economics of Education*, Elsevier B.V., http://dx.doi.org/10.1016/b978-0-444-53429-3.00007-7. [148]

Betts, J. and J. Shkolnik (2000), "The effects of ability grouping on student achievement and resource allocation in secondary schools", *Economics of Education Review*, Vol. 19/1, pp. 1-15, http://dx.doi.org/10.1016/s0272-7757(98)00044-2. [149]

BMBWF (2019), *Das Autonomiepaket der Bildungsreform [The autonomy package of education reform]*, https://bildung.bmbwf.gv.at/schulen/autonomie/index.html (accessed on 15 May 2019). [46]

Bonesrønning, H., T. Falch and B. Strøm (2005), "Teacher sorting, teacher quality, and student composition", *European Economic Review*, Vol. 49/2, pp. 457-483, http://dx.doi.org/10.1016/s0014-2921(03)00052-7. [16]

Boyd, D. et al. (2008), "The narrowing gap in New York City teacher qualifications and its implications for student achievement in high-poverty schools", *Journal of Policy Analysis and Management*, Vol. 27/4, pp. 793-818, http://dx.doi.org/10.1002/pam.20377. [7]

Boyd, D. et al. (2013), "Analyzing the determinants of the matching of public school teachers to jobs: Disentangling the preferences of teachers and employers", *Journal of Labor Economics*, Vol. 31/1, pp. 83-117, http://dx.doi.org/10.1086/666725. [120]

Boyd, D. et al. (2005), "The draw of home: How teachers' preferences for proximity disadvantage urban schools", *Journal of Policy Analysis and Management*, Vol. 24/1, pp. 113-132, http://dx.doi.org/10.1002/pam.20072. [56]

Branch, G., E. Hanushek and S. Rivkin (2012), "Estimating the effect of leaders on public sector productivity: The case of school principals", *NBER Working Papers*, No. 17803, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w17803. [23]

Brummet, Q., S. Gershenson and M. Hayes (2017), "Teachers' grade-level reassignments: Evidence from Michigan", *Educational Policy*, Vol. 31/2, pp. 249-271, http://dx.doi.org/10.1177/0895904815586857. [167]

Bryk, A. et al. (2010), *Organizing schools for improvement: Lessons from Chicago*, University of Chicago Press, Chicago. [144]

Burns, R. and D. Mason (1995), "Organizational constraints on the formation of elementary school classes", *American Journal of Education*, Vol. 103/2, pp. 185-212, http://dx.doi.org/10.1086/444096. [145]

Cabezas, V. et al. (2017), "First job and the unequal distribution of primary school teachers: Evidence for the case of Chile", *Teaching and Teacher Education*, Vol. 64, pp. 66-78, http://dx.doi.org/10.1016/j.tate.2017.01.017. [13]

Cannata, M. (2011), "The role of social networks in the teacher job search process", *The Elementary School Journal*, Vol. 111/3, pp. 477-500, http://dx.doi.org/10.1086/657656. [119]

Castillo, J., M. Curtis and S. Tan (2014), "Personnel needs in school psychology: A 10-year follow-up study on predicted personnel shortages", *Psychology in the Schools*, Vol. 51/8, pp. 832-849, http://dx.doi.org/10.1002/pits.21786. [39]

Centro de Estudios MINEDUC (2016), *Reporte Nacional de Chile: Revisión OCDE para mejorar la efectividad del uso de recursos en las escuelas, informe preparado por el Ministerio de Educación, la Agencia de Calidad de la Educación y la Superintendencia de Educación*, Ministerio de Educación, Santiago, Chile, http://www.oecd. org/edu/school/schoolresourcesreview.htm. [75]

Chingos, M. and M. West (2011), "Promotion and reassignment in public school districts: How do schools respond to differences in teacher effectiveness?", *Economics of Education Review*, Vol. 30/3, pp. 419-433, http://dx.doi.org/10.1016/j.econedurev.2010.12.011. [163]

Clotfelter, C. et al. (2008), "Would higher salaries keep teachers in high-poverty schools? Evidence from a policy intervention in North Carolina", *Journal of Public Economics*, Vol. 92/5-6, pp. 1352-1370, http://dx.doi.org/10.1016/j.jpubeco.2007.07.003. [130]

Clotfelter, C., H. Ladd and J. Vigdor (2009), "Are teacher absences worth worrying about in the US?", *Education Finance and Policy*, Vol. 4/2, pp. 115-149, https://doi.org/10.1162/edfp.2009.4.2.115. [171]

Clotfelter, C., H. Ladd and J. Vigdor (2005), "Who teaches whom? Race and the distribution of novice teachers", *Economics of Education Review*, Vol. 24/4, pp. 377-392, http://dx.doi.org/10.1016/j.econedurev.2004.06.008. [9]

Cohen-Vogel, L. (2011), "Staffing to the test", *Educational Evaluation and Policy Analysis*, Vol. 33/4, pp. 483-505, http://dx.doi.org/10.3102/0162373711419845. [155]

Combe, J., O. Tercieux and C. Terrier (2016), "Améliorer la mobilité des enseignants: Un nouvel algorithme ne pénalisant pas les académies les moins attractives", *Éducation et formations*, Vol. 92, pp. 57-75, https://halshs.archives-ouvertes.fr. [14]

Cruz-Aguayo, Y., P. Ibarrarán and N. Schady (2017), "Do tests applied to teachers predict their effectiveness?", *Economics Letters*, Vol. 159, pp. 108-111, http://dx.doi.org/10.1016/J.ECONLET.2017.06.035. [101]

Dabach, D. (2015), "Teacher placement into immigrant English learner classrooms", *American Educational Research Journal*, Vol. 52/2, pp. 243-274, http://dx.doi.org/10.3102/0002831215574725. [154]

Dal Bó, E., F. Finan and M. Rossi (2013), "Strengthening state capabilities: The role of financial incentives in the call to public service", *The Quarterly Journal of Economics*, Vol. 128/3, pp. 1169-1218, http://dx.doi.org/10.1093/qje/qjt008. [133]

Daly, T. et al. (2008), *MutualBenefits: New York City's Shift to Mutual Consent*, The New Teacher Project, New York, https://tntp.org/assets/documents/MutualBenefits.pdf (accessed on 15 February 2019). [108]

D'Amico, D. et al. (2017), "Where are all the black teachers? Discrimination in the teacher labor market", *Harvard Educational Review*, Vol. 87/1, pp. 26-49, http://dx.doi.org/10.17763/1943-5045-87.1.26. [121]

DeArmond, M., B. Gross and D. Goldhaber (2010), "Is it better to be good or lucky? Decentralized teacher selection in 10 elementary schools", *Educational Administration Quarterly*, Vol. 46/3, pp. 322-362, http://dx.doi.org/10.1177/0013161x10365824. [109]

Delany, B. (1991), "Allocation, choice, and stratification within high schools: How the sorting machine copes", *American Journal of Education*, Vol. 99/2, pp. 181-207, http://dx.doi.org/10.1086/443978. [146]

Department for Education (2018), *Staffing and employment advice for schools Departmental advice for school leaders, governing bodies, academy trusts and local authorities*, Department for Education, London, https://www.gov.uk/government/publications/staffing-and-employment-advice-for-schools (accessed on 2 February 2019). [82]

Department of Education and Skills (2019), *Redeployment Arrangementsat Primary Level for Surplus Permanent & CID Holding Teachers*, Department of Education and Skills, Dublin, https://www.education.ie/en/Schools-Colleges/Services/Teacher-Allocations/Teacher-Allocation/ta_primary_faq_redeployment_arrangements_19_20.pdf (accessed on 16 November 2018). [86]

Department of Education and Training Victoria (2019), *Human Resources: Working in more than one school*, https://www.education.vic.gov.au/hrweb/workm/Pages/multiple_employ.aspx (accessed on 25 January 2019). [88]

Department of Education and Training Victoria (2019), *Workforce Management - Schools*, https://www.education.vic.gov.au/hrweb/workm/Pages/workforce_mgmt_schools.aspx (accessed on 2 February 2019). [83]

Dhuey, E. and J. Smith (2018), "How school principals influence student learning", *Empirical Economics*, Vol. 54/2, pp. 851-882, http://dx.doi.org/10.1007/s00181-017-1259-9. [99]

Echazarra, A. and T. Radinger (2019), "Learning in rural schools: Insights from PISA, TALIS and the literature", *OECD Education Working Papers*, No. 196, OECD Publishing, Paris, https://dx.doi.org/10.1787/8b1a5cb9-en. [58]

Education Review Office (2018), *Resource Teachers: Learning and Behaviour Governing and Managing RTLB Clusters*, Education Review Office, Wellington, https://www.ero.govt.nz/assets/Uploads/RTLB-Evaluation-Report2.pdf (accessed on 5 December 2018). [179]

Engel, M. and M. Cannata (2015), "Localism and teacher labor markets: How geography and decision making may contribute to inequality", *Peabody Journal of Education*, Vol. 90/1, pp. 84-92, http://dx.doi.org/10.1080/0161956X.2015.988533. [57]

Engel, M., M. Cannata and F. Curran (2018), "Principal influence in teacher hiring: documenting decentralization over time", *Journal of Educational Administration*, Vol. 56/3, pp. 277-296, http://dx.doi.org/10.1108/jea-05-2017-0061. [114]

Engel, M. and M. Finch (2014), "Staffing the classroom: How urban principals find teachers and make hiring decisions", *Leadership and Policy in Schools*, Vol. 14/1, pp. 12-41, http://dx.doi.org/10.1080/15700763.2014.983131. [125]

Estonian Ministry of Education and Research (2015), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Estonia*, Estonian Ministry of Education and Research, Tartu, http://www.oecd.org/education/schoolresourcesreview.htm. [180]

Estrada, R. (2019), "Rules versus discretion in public service: Teacher hiring in Mexico", *Journal of Labor Economics*, Vol. 37/2, pp. 545-579, http://dx.doi.org/10.1086/700192. [102]

European Commission, EACEA and Eurydice (2018), *Teaching careers in Europe: Access, progression and support. Eurydice Report*, Publications Office of the European Union, Luxembourg, https://eacea.ec.europa.eu/national-policies/eurydice/publications_en (accessed on 18 February 2019). [49]

Eurydice (2019), *Database of National Education Systems*, https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en. [85]

Feng, L. (2010), "Hire today, gone tomorrow: New teacher classroom assignments and teacher mobility", *Education Finance and Policy*, Vol. 5/3, pp. 278-316, http://dx.doi.org/10.1162/edfp_a_00002. [141]

Feng, L., D. Figlio and T. Sass (2018), "School accountability and teacher mobility", *Journal of Urban Economics*, Vol. 103, pp. 1-17, http://dx.doi.org/10.1016/j.jue.2017.11.001. [137]

Finan, F., B. Olken and R. Pande (2015), "The personnel economics of the state", *NBER Working Papers*, No. 21825, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w21825. [118]

Flemish Ministry of Education and Training (2015), *OECD Review of Policies to Improve the Effectiveness ofResource Use in Schools: Country Background Report of the Flemish Community of Belgium*, Flemish Ministry of Education and Training, Brussels, http://www.oecd.org/education/schoolresourcesreview.htm. [63]

Fredriksson, P., L. Hensvik and O. Skans (2018), "Mismatch of talent: Evidence on match quality, entry wages, and job mobility", *American Economic Review*, Vol. 108/11, pp. 3303-3338, http://dx.doi.org/10.1257/aer.20160848. [92]

Fryer, R. (2018), "The "pupil" factory: Specialization and the production of human capital in schools", *American Economic Review*, Vol. 108/3, pp. 616-656, http://dx.doi.org/10.1257/aer.20161495. [168]

Fuller, S. and H. Ladd (2013), "School-based accountability and the distribution of teacher quality across grades in elementary school", *Education Finance and Policy*, Vol. 8/4, pp. 528-559, http://dx.doi.org/10.1162/edfp_a_00112. [164]

Gershenson, S. (2016), "Linking teacher quality, student attendance, and student achievement", *Education Finance and Policy*, Vol. 11/2, pp. 125-149, https://doi.org/10.1162/EDFP_a_00180. [106]

Gershenson, S., S. Holt and N. Papageorge (2016), "Who believes in me? The effect of student–teacher demographic match on teacher expectations", *Economics of Education Review*, Vol. 52, pp. 209-224, http://dx.doi.org/10.1016/j.econedurev.2016.03.002. [122]

Gjefsen, H. and T. Gunnes (2015), "School accountability: Incentives or sorting?", *Discussion Papers*, No. 8015, Statistics Norway, Research Department, https://www.ssb.no/en/forskning/discussion-papers (accessed on 15 December 2018). [138]

Goldhaber, D. et al. (2015), "Crossing the border? Exploring the cross-state mobility of the teacher workforce", *Educational Researcher*, Vol. 44/8, pp. 421-431, http://dx.doi.org/10.3102/0013189x15613981. [89]

Goldhaber, D., L. Lavery and R. Theobald (2015), "Uneven playing field? Assessing the teacher quality gap between advantaged and disadvantaged students", *Educational Researcher*, Vol. 44/5, pp. 293-307, http://dx.doi.org/10.3102/0013189x15592622. [5]

Grissom, J., D. Kalogrides and S. Loeb (2017), "Strategic staffing? How performance pressures effect the distribution of teachers within schools and resulting student achievement", *American Educational Research Journal*, Vol. 54/6, pp. 1079-1116, http://dx.doi.org/10.3102/0002831217716301. [162]

Grissom, J., D. Kalogrides and S. Loeb (2015), "The micropolitics of educational inequality: The case of teacher–student assignments", *Peabody Journal of Education*, Vol. 90/5, pp. 601-614, http://dx.doi.org/10.1080/0161956x.2015.1087768. [159]

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. [126]

Guerrero, G. et al. (2013), "Getting teachers back to the classroom. A systematic review on what works to improve teacher attendance in developing countries", *Journal of Development Effectiveness*, Vol. 5/4, pp. 466-488, http://dx.doi.org/10.1080/19439342.2013.864695. [172]

Hanushek, E., J. Kain and S. Rivkin (2004), "Why public schools lose teachers", *The Journal of Human Resources*, Vol. 39/2, p. 326, http://dx.doi.org/10.2307/3559017. [129]

Hanushek, E., S. Link and L. Woessmann (2013), "Does school autonomy make sense everywhere? Panel estimates from PISA", *Journal of Development Economics*, Vol. 104, pp. 212-232, http://dx.doi.org/10.1016/j.jdeveco.2012.08.002. [112]

Harris, D. et al. (2010), "Mix and match: What principals really look for when hiring teachers", *Education Finance and Policy*, Vol. 5/2, pp. 228-246, http://dx.doi.org/10.1162/edfp.2010.5.2.5205. [107]

Helbig, M. and R. Nikolai (2019), "Bekommen die sozial benachteiligsten Schüler*innen die „besten" Schulen?Eine explorative Studie über den Zusammenhang von Schulqualität und sozialer Zusammensetzung von Schulen am Beispiel Berlin", *Discussion Papers*, No. 002, Wissenschaftszentrum Berlin für Sozialforschung, Berlin, http://hdl.handle.net/10419/194005. [170]

Hensvik, L. (2012), "Competition, wages and teacher sorting: Lessons learned from a voucher reform", *The Economic Journal*, Vol. 122/561, pp. 799-824, http://dx.doi.org/10.1111/j.1468-0297.2012.02514.x. [26]

HEQCO (2019), *Higher Education Quality Council of Ontario*, http://www.heqco.ca (accessed on 15 May 2019). [48]

Herrmann, M. and J. Rockoff (2012), "Worker absence and productivity: Evidence from teaching", *Journal of Labor Economics*, Vol. 30/4, pp. 749-782, http://dx.doi.org/10.1086/666537. [173]

Hill, A. and D. Jones (2018), "A teacher who knows me: The academic benefits of repeat student-teacher matches", *Economics of Education Review*, Vol. 64, pp. 1-12, http://dx.doi.org/10.1016/j.econedurev.2018.03.004. [169]

Horoi, I. and B. Ost (2015), "Disruptive peers and the estimation of teacher value added", *Economics of Education Review*, Vol. 49, pp. 180-192, http://dx.doi.org/10.1016/j.econedurev.2015.10.002. [153]

Hurwitz, M. and J. Howell (2013), *Measuring the Impact of High School Counselors on College Enrollment*, College Board, Washington, DC, https://research.collegeboard.org/ (accessed on 16 May 2019). [178]

Icelandic Ministry of Education, S. (2014), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Iceland*, Iceland Ministry of Education, Science and Culture, http://www.oecd.org/education/schoolresourcesreview.htm. [84]

IIEP-UNESCO (2016), "More effective teacher allocation in Africa", *Pôlemag*, Vol. 24, pp. 8-13, https://poledakar.iiep.unesco.org/en/publications/polemag (accessed on 25 November 2018). [80]

Ingersoll, R. (2005), "Four myths about America's teacher quality problem", *Yearbook of the National Society for the Study of Education*, Vol. 103/1, pp. 1-33, http://dx.doi.org/10.1111/j.1744-7984.2004.tb00029.x. [156]

Instituto Nacional de Evaluación Educativa (INEEd) (2016), *Encuesta Nacional Docente 2015: Primeros resultados*, https://www.ineed.edu.uy/images/pdf/presentacion-encuesta-nacional.pdf (accessed on 30 November 2018). [91]

Isenberg, E. et al. (2016), *Do Low-Income Students Have Equal Access to Effective Teachers? Evidence from 26 Districts (NCEE 2017-4007)*, National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, US Department of Education, http://ies.ed.gov/ncee (accessed on 16 May 2019). [29]

Jackson, C. (2013), "Match quality, worker productivity, and worker mobility: Direct evidence from teachers", *Review of Economics and Statistics*, Vol. 95/4, pp. 1096-1116, http://dx.doi.org/10.1162/rest_a_00339. [97]

Jackson, C. (2012), "School competition and teacher labor markets: Evidence from charter school entry in North Carolina", *Journal of Public Economics*, Vol. 96/5-6, pp. 431-448, http://dx.doi.org/10.1016/j.jpubeco.2011.12.006. [28]

Jackson, C. (2009), "Student demographics, teacher sorting, and teacher quality: Evidence from the end of school desegregation", *Journal of Labor Economics*, Vol. 27/2, pp. 213-256, http://dx.doi.org/10.1086/599334. [6]

Jacob, B. and L. Lefgren (2007), "What do parents value in education? An empirical investigation of parents' revealed preferences for teachers", *The Quarterly Journal of Economics*, Vol. 122/4, pp. 1603-1637, http://dx.doi.org/10.1162/qjec.2007.122.4.1603. [161]

Jacob, B. et al. (2018), "Teacher applicant hiring and teacher performance: Evidence from DC public schools", *Journal of Public Economics*, Vol. 166, pp. 81-97, http://dx.doi.org/10.1016/j.jpubeco.2018.08.011. [117]

Jaramillo, M. (2012), "The spatial geography of teacher labor markets: Evidence from a developing country", *Economics of Education Review*, Vol. 31/6, pp. 984-995, http://dx.doi.org/10.1016/J.ECONEDUREV.2012.07.005. [53]

Johnson, S. (2009), "How best to add value? Strike a balance between the individual and the organization in school reform", *EPI Briefing Papers*, No. 249, Economic Policy Institute, Washington, DC, https://www.epi.org/publication/bp249 (accessed on 12 December 2018). [142]

Jovanovic, B. (1979), "Job matching and the theory of turnover", *Journal of Political Economy*, Vol. 87/5, pp. 972-990, https://www.jstor.org/stable/1833078. [94]

Kalogrides, D., S. Loeb and T. Béteille (2013), "Systematic sorting: Teacher characteristics and class assignments", *Sociology of Education*, Vol. 86/2, pp. 103-123, http://dx.doi.org/10.1177/0038040712456555. [152]

Kane, B. and B. Rosenquist (2019), "Relationships between instructional coaches' time use and district- and school-level policies and expectations", *American Educational Research Journal*, http://dx.doi.org/10.3102/0002831219826580. [72]

Kane, T., J. Rockoff and D. Staiger (2008), "What does certification tell us about teacher effectiveness? Evidence from New York City", *Economics of Education Review*, Vol. 27, pp. 615-631, https://doi.org/10.1016/j.econedurev.2007.05.005. [105]

Karsten, S. (2006), "Policies for disadvantaged children under scrutiny: The Dutch policy compared with policies in France, England, Flanders and the USA", *Comparative Education*, Vol. 42/2, pp. 261-282, http://dx.doi.org/10.1080/03050060600628694. [128]

Kim, Y. (2017), "Does autonomy over teacher hiring affect student math and science achievement?", *Education Economics*, Vol. 25/6, pp. 562-574, http://dx.doi.org/10.1080/09645292.2017.1328044. [110]

Klemm, K. and D. Zorn (2017), *Demographische Rendite adé Aktuelle Bevölkerungsentwicklung und Folgen für die allgemeinbildenden Schulen*, Bertelsmann Stiftung, Gütersloh, https://www.bertelsmann-stiftung.de (accessed on 17 February 2019). [35]

KMK (2018), *Lehrereinstellungsbedarf und -angebot in der Bundesrepublik Deutschland 2018 – 2030*, Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland, Berlin, https://www.kmk.org/fileadmin/Dateien/pdf/Statistik/Dokumentationen/Dok_216_Bericht_LEB_LEA_2018.pdf (accessed on 1 April 2019). [45]

Kraft, M. et al. (2018), "Teacher accountability reforms and the supply of new teachers", https://scholar.harvard.edu/mkraft/publications (accessed on 16 April 2019). [33]

Kraft, M. et al. (2015), "Educating amid uncertainty", *Educational Administration Quarterly*, Vol. 51/5, pp. 753-790, http://dx.doi.org/10.1177/0013161x15607617. [1]

Lankford, H., S. Loeb and J. Wyckoff (2002), "Teacher sorting and the plight of urban schools: A descriptive analysis", *Educational Evaluation and Policy Analysis*, Vol. 24/1, pp. 37-62, http://dx.doi.org/10.3102/01623737024001037. [10]

Liebowitz, D. et al. (2018), *OECD Reviews of School Resources: Portugal 2018*, OECD Reviews of School Resources, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264308411-en. [51]

Little, J. and L. Bartlett (2010), "The teacher workforce and problems of educational equity", *Review of Research in Education*, Vol. 34/1, pp. 285-328, https://doi.org/10.3102/0091732X09356099. [2]

Liu, E. and S. Johnson (2006), "New teachers' experiences of hiring: Late, rushed, and information-poor", *Educational Administration Quarterly*, Vol. 42/3, pp. 324-360, http://dx.doi.org/10.1177/0013161x05282610. [113]

Loeb, S., D. Kalogrides and E. Horng (2010), "Principal preferences and the uneven distribution of principals across schools", *Educational Evaluation and Policy Analysis*, Vol. 32/2, pp. 205-229, http://dx.doi.org/10.3102/0162373710369833. [21]

Lortie, D. (1975), *Schoolteacher: A Sociological Study*, University of Chicago Press, Chicago. [135]

Louis, K. et al. (2010), *Investigating the Links to Improved Student Learning – Final Report of Research Findings, University of Minnesota, University of Toronto, a report commissioned by the Wallace Foundation*, University of Minnesota, Minneapolis, MN, https://www.wallacefoundation.org/knowledge-center/pages/investigating-the-links-to-improved-student-learning.aspx (accessed on 16 December 2018). [24]

Luschei, T. and A. Chudgar (2017), *Teacher Distribution in Developing Countries*, Palgrave Macmillan, New York, NY, http://dx.doi.org/10.1057/978-1-137-57926-3. [3]

Mansfield, R. (2015), "Teacher quality and student inequality", *Journal of Labor Economics*, Vol. 33/3, pp. 751-788, http://dx.doi.org/10.1086/679683. [150]

Maughan, E. (2018), "School nurses: An investment in student achievement", *Phi Delta Kappan*, Vol. 99/7, pp. 8-14, http://dx.doi.org/10.1177/0031721718767853. [73]

Miller, R., R. Murnane and J. Willett (2008), "Do teacher absences impact student achievement? Longitudinal evidence from one urban school district", *Educational Evaluation and Policy Analysis*, Vol. 30/2, pp. 181-200, http://dx.doi.org/10.3102/0162373708318019. [174]

Ministère de la Fédération Wallonie-Bruxelles (2016), *Examen de l'OCDE des politiques pour un usage plus efficace des ressources scolaires RAPPORT PAYS Communauté française de Belgique*, Ministère de la Fédération Wallonie-Bruxelles, Bruxelles, http://www.oecd.org/education/school-resources-review/reports-for-participating-countries-country-background-reports.htm. [62]

Ministry of Education (2019), *Surplus staffing support for a reduction in staffing entitlement*, https://www.education.govt.nz/school/funding-and-financials/resourcing/school-staffing/surplus-staffing-support/ (accessed on 25 January 2019). [87]

Ministry of Education and Research (2016), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report of Sweden*, Swedish Ministry of Education and Research, Stockholm, http://www.oecd.org/education/schoolresourcesreview. [78]

Monk, D. (1987), "Assigning elementary pupils to their teachers", *The Elementary School Journal*, Vol. 88/2, pp. 167-187, http://dx.doi.org/10.1086/461531. [140]

Murnane, R. and J. Steele (2007), "What is the problem? The challenge of providing effective teachers for all children", *The Future of children*, Vol. 17/1, pp. 15-43, https://www.jstor.org/stable/4150018. [8]

NACAC (2018), *State-by-State Student-to-Counselor Ratio Report*, National Association for College Admission Counseling, Arlington, VA, https://www.nacacnet.org/news--publications/Research/state-by-state-student-to-counselor-ratio-report2 (accessed on 17 May 2019). [177]

Nagler, M., M. Piopiunik and M. West (2015), "Weak markets, strong teachers: Recession at career start and teacher effectiveness", *NBER Working Papers*, No. 21393, http://dx.doi.org/10.3386/w21393. [32]

Naper, L. (2010), "Teacher hiring practices and educational efficiency", *Economics of Education Review*, Vol. 29/4, pp. 658-668, http://dx.doi.org/10.1016/j.econedurev.2009.11.002. [115]

NASUWT (2017), "Supply Teachers annual survey of experiences", https://www.nasuwt.org.uk/uploads/assets/uploaded/e7d27137-a3cb-4db8-ae6d1c34024d344a.pdf (accessed on 12 April 2019). [175]

Nusche, D. et al. (2015), *OECD Reviews of School Resources: Flemish Community of Belgium 2015*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264247598-en. [70]

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

Nusche, D. et al. (2016), *OECD Reviews of School Resources: Denmark 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262430-en. [34]

OECD (2019), *A Flying Start: Improving Initial Teacher Preparation Systems*, OECD Publishing, Paris, http://dx.doi.org/10.1787/cf74e549-en. [59]

OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/1d0bc92a-en. [37]

OECD (2018), *Education at a Glance 2018: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2018-en. [100]

OECD (2018), *Effective Teacher Policies: Insights from PISA*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264301603-en. [4]

OECD (2018), *Responsive School Systems: Connecting Facilities, Sectors and Programmes for Student Success*, OECD Reviews of School Resources, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264306707-en. [25]

OECD (2017), *The Funding of School Education: Connecting Resources and Learning*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264276147-en. [79]

OECD (2016), *Low-Performing Students: Why They Fall Behind and How To Help Them Succeed*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264250246-en. [30]

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. [147]

OECD (2014), *TALIS 2013 Results: An International Perspective on Teaching and Learning*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264196261-en. [90]

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. [67]

OECD/The World Bank (2015), *OECD Reviews of School Resources: Kazakhstan 2015*, OECD Reviews of School Resources, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264245891-en. [60]

Ontario College of Teachers (2018), *Transition to Teaching 2018*, Ontario College of Teachers, Toronto, ON, https://www.oct.ca/becoming-a-teacher/transition-to-teaching (accessed on 1 April 2019). [47]

Ost, B. and J. Schiman (2015), "Grade-specific experience, grade reassignments, and teacher turnover", *Economics of Education Review*, Vol. 46, pp. 112-126, http://dx.doi.org/10.1016/j.econedurev.2015.03.004. [166]

Özoğlu, M. (2015), "Mobility-related teacher turnover and the unequal distribution of experienced teachers in Turkey", *Educational Sciences: Theory & Practice*, Vol. 15/4, http://dx.doi.org/10.12738/estp.2015.4.2619. [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. [61]

Papay, J. and M. Kraft (2016), "The productivity costs of inefficient hiring practices: Evidence from late teacher hiring", *Journal of Policy Analysis and Management*, Vol. 35/4, pp. 791-817, http://dx.doi.org/10.1002/pam.21930. [123]

Paufler, N. and A. Amrein-Beardsley (2014), "The random assignment of students into elementary classrooms", *American Educational Research Journal*, Vol. 51/2, pp. 328-362, http://dx.doi.org/10.3102/0002831213508299. [158]

Player, D. (2010), "Nonmonetary compensation in the public teacher labor market", *Education Finance and Policy*, Vol. 5/1, pp. 82-103, http://dx.doi.org/10.1162/edfp.2009.5.1.5105. [157]

Prost, C. (2013), "Teacher mobility: Can financial incentives help disadvantaged schools to retain their teachers?", *Annals of Economics and Statistics* 111/112, p. 171, http://dx.doi.org/10.2307/23646330. [52]

Pugatch, T. and E. Schroeder (2014), "Incentives for teacher relocation: Evidence from the Gambian hardship allowance", *Economics of Education Review*, Vol. 41, pp. 120-136, http://dx.doi.org/10.1016/J.ECONEDUREV.2014.04.003. [132]

Qureshi, J. and B. Ost (2018), "The role of families in student sorting to teachers", *Journal of Human Resources*, pp. 0717-8953R2, http://dx.doi.org/10.3368/jhr.55.3.0717-8953r2. [160]

Radinger, T. et al. (2018), *OECD Reviews of School Resources: Colombia 2018*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264303751-en. [18]

Rechnungshof Österreich (2018), *Bericht des Rechnungshofes Gesundheit der Schüler: Schulärztlicher Dienst und Schulpsychologischer Dienst; Follow–up–Überprüfung [Report of the Court of Audit Student Health: School Medical Services and School Psychology Services; Follow up Evaluation]*, Rechnungshof Österreich, Wien, http://www.rechnungshof.gv.at (accessed on 15 May 2019). [74]

Reininger, M. (2012), "Hometown disadvantage? It depends on where you're from", *Educational Evaluation and Policy Analysis*, Vol. 34/2, pp. 127-145, http://dx.doi.org/10.3102/0162373711420864. [54]

Rice, S. (2010), "Getting our best teachers into disadvantaged schools: Differences in the professional and personal factors attracting more effective and less effective teachers to a school", *Educational Research for Policy and Practice*, Vol. 9/3, pp. 177-192, http://dx.doi.org/10.1007/s10671-010-9085-2. [136]

Rockoff, J. et al. (2011), "Can you recognize an effective teacher when you recruit one?", *Education Finance and Policy*, Vol. 6/1, pp. 43-74, http://dx.doi.org/10.1162/EDFP_a_00022. [104]

Rutledge, S. et al. (2008), "Certify, blink, hire: An examination of the process and tools of teacher screening and celection", *Leadership and Policy in Schools*, Vol. 7/3, pp. 237-263, http://dx.doi.org/10.1080/15700760701822132. [116]

Sánchez, J. (2018), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Colombia*, Ministerio de Educación Nacional, Bogotá DC, http://www.oecd.org/education/schoolresourcesreview.htm. [77]

Santiago, P. (2002), "Teacher Demand and Supply: Improving Teaching Quality and Addressing Teacher Shortages", *OECD Education Working Papers*, No. 1, OECD Publishing, Paris, https://dx.doi.org/10.1787/232506301033. [64]

Santiago, P. et al. (2016), *OECD Reviews of School Resources: Uruguay 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264265530-en. [22]

Santiago, P. et al. (2017), *OECD Reviews of School Resources: Chile 2017*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264285637-en. [31]

Santiago, P. et al. (2016), *OECD Reviews of School Resources: Slovak Republic 2015*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264247567-en. [19]

Santiago, P. et al. (2016), *OECD Reviews of School Resources: Estonia 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264251731-en. [40]

Schlicht-Schmälzle, R., J. Teltemann and M. Windzio (2011), "Deregulation of education – What does it matter for efficiency and equality?", *TransState Working Papers*, No. 157, University of Bremen, Bremen, http://hdl.handle.net/10419/52224. [124]

Shewbridge, C. et al. (2016), *OECD Reviews of School Resources: Lithuania 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264252547-en. [20]

Shewbridge, C. et al. (2016), *OECD Reviews of School Resources: Czech Republic 2016*, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262379-en. [42]

Slovenian Ministry of Education, S. (2017), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report of Slovenia*, Slovenian Ministry of Education, Science and Sport, http://www.oecd.org/edu/school/schoolresourcesreview.htm. [71]

Spillane, J., R. Halverson and J. Diamon (2004), "Towards a theory of leadership practice: a distributed perspective", *Journal of Curriculum Studies*, Vol. 36/1, pp. 3-34, http://dx.doi.org/10.1080/0022027032000106726. [98]

Staiger, D. and J. Rockoff (2010), "Searching for effective teachers with imperfect information", *Journal of Economic Perspectives*, Vol. 24/3, pp. 97-118, http://dx.doi.org/10.1257/jep.24.3.97. [103]

Steele, J., R. Murnane and J. Willett (2010), "Do financial incentives help low-performing schools attract and keep academically talented teachers? Evidence from California", *Journal of Policy Analysis and Management*, Vol. 29/3, pp. 451-478, http://dx.doi.org/10.1002/pam.20505. [131]

Sveriges Kommuner och Landsting (2018), *Fokus pa: Skolans rekryteringsutmaningar [Focus on: Schools' recruitment challenges]*, Sveriges Kommuner och Landsting, Stockholm, https://webbutik.skl.se/sv/artiklar/skolans-rekryteringsutmaningar-.html (accessed on 10 February 2019). [36]

The Teaching Council (2015), *Striking the Balance Teacher Supply in Ireland: Technical Working Group Report*, An Chomhairle Mhúinteoireachta/The Teaching Council, Kildare, https://www.teachingcouncil.ie/en/Publications/Teacher-Education/Teacher-Supply-in-Ireland.pdf (accessed on 1 April 2019). [38]

UNESCO (2018), *Global Education Monitoring Report 2019: Migration, Displacement and Education – Building Bridges, not Walls*, UNESCO, Paris, https://en.unesco.org/gem-report/allreports (accessed on 10 May 2019). [65]

UNESCO (2014), *EFA Global Monitoring Report 2013/14 Teaching and Learning: Achieving Quality for All*, UNESCO, Paris, https://en.unesco.org/gem-report/allreports (accessed on 25 November 2018). [17]

UNESCO-OECD-Eurostat (2018), *UOE Data Collection on Formal Education: Manual on Concepts, Definitions and Classifications*, UNESCO, OECD. Eurostat, Montreal, Paris, Luxembourg, http://uis.unesco.org/sites/default/files/documents/uoe2016manual_11072016_0.pdf (accessed on 18 June 2019). [69]

Urquiola, M. and E. Vegas (2005), "Arbitrary variation in teacher salaries: An analysis of teacher pay in Bolivia", in Vegas, E. (ed.), *Incentives to improve teaching: Lessons from Latin America*, World Bank, Washington D.C., http://hdl.handle.net/10986/7265. [134]

Vegas, E. and A. Ganimian (2013), "Theory and evidence on teacher policies in developed and developing countries", *IDB Working Paper Series*, No. 438, Inter-American Development Bank, Washington, DC, https://publications.iadb.org (accessed on 15 December 2018). [96]

Woodcock, S. (2015), "Match effects", *Research in Economics*, Vol. 69/1, pp. 100-121, http://dx.doi.org/10.1016/j.rie.2014.12.001. [93]

Wössmann, L. (2003), "Schooling resources, educational institutions and student performance: The international evidence", *Oxford Bulletin of Economics and Statistics*, Vol. 65/2, pp. 117-170, http://dx.doi.org/10.1111/1468-0084.00045. [111]

Xu, Z., U. Özek and M. Corritore (2012), "Portability of teacher effectiveness across schools", *CALDER Working Papers*, No. 77, National Center for Analysis of Longitudinal Data in Education Research American Institutes for Research, Washington, DC, https://caldercenter.org/publications/portability-teacher-effectiveness-across-schools. [95]

Zeichner, K. (2014), "The struggle for the soul of teaching and teacher education in the USA", *Journal of Education for Teaching*, Vol. 40/5, pp. 551–568, http://dx.doi.org/10.1080/02607476.2014.956544. [68]

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